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ROAD SAFETY PILOT STUDY

NATO Committee on the Challenges of Modern Society

Prepared for:

National Highway Traffic Safety Administration

15 March 1974

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ROAD SAFETY PILOT STUDY

COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY

CCMS REPORT NO. 21

L'ETUDE PILOTE SUR LA SÉCURITÉ ROUTIÈRE

COMITÉ SUR LES DÉFIS DE LA SOCIÉTÉ MODERNE

RAPPORT Nº 21 DU CDSM

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U.S. Department of Transportation
National Highway Traffic Safety Administration

PREFACE

In November 1969, the North Atlantic Council created the Committee on the Challenges of Modern Society (CCMS) to deal with environmental and other problems which significantly impair the quality of life in modern industrialized societies. CCMS held its first Plenary Session the following month at which time the United States proposed to lead a Pilot Study on Road Safety. The Council approved the road safety proposal in January 1970.

A number of activities were then initiated under the auspices of this Pilot Study or in conjunction with it. This is the final report on the effort and has been prepared in a large measure from a number of other documents that have been, or shortly will be, published on various projects of the Pilot Study. These reports are listed in Appendix 5.

It was recognized from the start that the Pilot Study could not address all aspects of the problem; to be manageable, the effort would have to be limited to a group of projects each dealing with one of the countermeasures required to reduce traffic casualties. Moreover, project leadership responsibilities would have to be assumed by several participating nations if the effort was to be successfully completed within any reasonable period of time.

The response of NATO Allies and certain other countries was most gratifying. Seven separate projects were organized, each led by a different nation. Many members participated actively in all projects; others participated in those of priority interest in which they judged they could contribute.

The United States, as pilot country, is most appreciative of the support of other countries in the common pursuit of finding better ways to reduce traffic casualties. Many countries and individuals within those countries deserve recognition; particular mention is made here of the countries which led the various projects and the road safety experts who undertook leadership and liaison responsibilities.

Pedestrian Safety – BELGIUM

Project Leader: J. P. DeCoster
Pilot Study Liaison: M. B. Snyder

Alcohol and Highway Safety – CANADA

Project Leader: G. D. Campbell
Pilot Study Liaison: R. B. Voas

Motor Vehicle Inspection – FEDERAL REPUBLIC OF GERMANY

Project Leaders: K. Kurz
E. Huttebraucker
Pilot Study Liaison: G. L. Parker

Identification and Correction of Road Hazards – FRANCE

Project Leader: M. Frybourg
Pilot Study Liaison: C. W. Prisk

Emergency Medical Services – ITALY

Project Leader: G. Spalatin (M.D.)
Pilot Study Liaison: D. A. Mills (M.D.)

Accident Investigation – THE NETHERLANDS

Project Leader: J. C. Kuiberbak
Pilot Study Liaison: E. E. Flamboe

Experimental Safety Vehicles – UNITED STATES

Project Leaders:
- V. J. Esposito
- J. A. Edwards
- A. A. Slechter
- W. E. Scott

National Coordinators:
- H. Wagner, Federal Republic of Germany
- H. Jungblut, Federal Republic of Germany
- M. Frybourg, France
- A. Sirignano, Italy
- Y. Nakamura, Japan
- G. Ekberg, Sweden
- H. Taylor, United Kingdom

In discussing the ESV and Accident Investigation Projects, occasional reference has been made to Japan and Sweden. It should be noted that the governments of Japan and Sweden were not formal participants in the CCMS Road Safety Pilot Study but became involved with the substance of the work through separate bilateral Memoranda of Understanding with the United States in the case of the ESV Project or through status as observer in the case of the Accident Investigation Project. References to Japanese and Swedish participation should be understood in the foregoing context and any implication otherwise is inadvertent.

The success of the Pilot Study stems directly from the high-level government support. On the other hand, without the cooperation of the world-wide automotive industry, some of the Pilot Study activities such as those concerning the Experimental Safety Vehicles (ESV), could not have been undertaken. While one may correctly observe that much of industry's participation was in its own interest, the degree of company involvement, often with little governmental support, extended far beyond the boundaries of self-interest, having as it did limited prospect of immediate return on the considerable resources expended.

Industry participation was not limited to the ESV program. Many of the research medical-engineering teams working under the auspices of the Pilot Study's Accident Investigation Project were supported directly by industry.

Moreover, two major CCMS conferences on passive restraints to protect vehicle occupants in crashes were supported almost entirely by industry. The first of these was held at the General Motors Proving Ground in May 1970 less than five months after the Pilot Study was started.

It was the personal decision of Mr. James M. Roche, then Chairman of the Board of General Motors Corporation, to support this meeting which was attended by over 400 of the world's leading automotive experts. This decision marked the beginning of extensive industry cooperation in the ESV and Accident Investigation Projects. Special recognition should be given in these respects to:

AB Volvo
Adam Opel AG
Alfa Romeo S.p.A.
AMF Inc.
Automobiles Peugeot S.A.
Bayerische Motoren Werke AG
BLMC – British Leyland Corporation, Ltd.
Citroen S. A.
Daimler-Benz AG
Fairchild Industries
Fiat S.p.A.
Ford Motor Company
General Motors Corp.
Honda Research and Development Company, Ltd.
Nissan Motor Company, Ltd.
h.c. F. Porsche KG
Regie Nationale Des Usines Renault
SAAB-Scania AB
Toyota Motor Company, Ltd.
Volkswagenwerk AG
Bureau Permanent International Des Constructeurs Automobiles (Europe)
Japan Automobile Manufacturers Association
Motor Vehicle Manufacturers Association (United States)

Many others have made important contributions leading to the successful completion of this Pilot Study which, at the direction of U. S. President Nixon, had the highest-level support of the U. S. government. It is not practical to acknowledge all of these persons. However, the individual who deserves the most credit for his dedication and wise direction of the Pilot Study is Dr. Robert Brenner, formerly Acting Director, National Highway Safety Bureau, and later Chief Scientist of the U. S. National Highway Traffic Safety Administration, the successor organization of the Safety Bureau.

As a result of Dr. Brenner's leadership and hard work by staffers and program officials in all the countries involved, a significant step forward has been made in international cooperation in road safety. Equal dedication will be required to maintain the momentum achieved and provide effective followup, thus enabling the nations of the world to continue to aid each other in reducing significantly traffic deaths, injuries, and attendant human suffering.

James B. Gregory
Administrator
U. S. National Highway Traffic Safety Administration
Pilot Study Director

March 15, 1974

SUMMARY

Vehicle crashes in NATO countries kill over a half million people every four years. With both the number of vehicles and amount of vehicle travel increasing sharply, higher numbers of casualties can be expected unless better road safety programs are implemented on a priority basis. A more effective pooling of the world's best technology and experience was urgently required. This was the reason why the Committee on the Challenges of Modern Society (CCMS) at its first meeting in 1969 adopted the United States proposal to lead a Pilot Study on road safety. The effort was planned around three premises:

1. *Orientation toward applied technology and practices, not research.* Many road safety technologies and practices were known in one country or another; all countries could benefit by sharing these experiences.
2. *There is no single universal solution to road safety.* The nature of the road safety problem varies widely among countries, as do available resources for corrective action. Each country, therefore, has to intensify its efforts in accord with its priorities.
3. *A systems approach should be used to solve the problem.* Reduction in traffic deaths and serious injuries is the common goal, and can be attained by different combinations of measures aimed at preventing crashes ("primary safety") or designed to improve the chances of surviving a crash once it occurs ("secondary safety").

The Pilot Study was comprised of seven projects each led by a member of the Alliance, with other members and nonmembers participating in varying degrees. All of these projects involved field work and scientific analysis by some of the world's leading experts. Some of the more important conclusions and achievements in each of the project areas are:

- *Identification and Correction of Road Hazards – France:* More lives per unit of expenditure are often saved in correcting certain high-risk locations in existing roads than in building new roads. Budget allocations do not adequately reflect this well-demonstrated finding because new road construction provides for more rapid transit and is much more visible to the public.
- *Pedestrian Safety – Belgium:* Motor vehicles kill more pedestrians than any other single class of road user, accounting for as much as 34 percent of all traffic fatalities in some countries. Nevertheless, national commitments to improve pedestrian safety are far below levels commensurate with the losses involved.
- *Motor Vehicle Inspection – Federal Republic of Germany:* Although a vehicle in dangerous mechanical condition (e.g., with poor brakes) can cause serious accidents, the extent to which such defects are present in vehicles involved in crashes is not accurately known. Also unknown is the extent to which motor vehicle inspections reduce the likelihood of defect-related crashes.
- *Accident Investigation – The Netherlands:* An international system is both feasible and useful, under which a number of nations and their automotive industries use mutually agreed upon protocols for conducting in-depth research type accident investigations and exchanging the resulting data. The project developed such a protocol. Although the 520 investigations conducted on a trial basis under the Pilot Study were limited to considerations of secondary safety (occupant protection) the same cooperative methods are applicable to studying problems of primary safety, e.g., brakes, steering, and suspension.
- *Alcohol and Highway Safety – Canada:* Drinking alcoholic beverages and driving is a problem throughout the world. It is tied closely in any given country to drinking habits and general attitudes toward drinking. Although the optimum deterrents will therefore vary among countries, the overriding requirement throughout is to develop and validate methods for evaluating the effectiveness of alternative countermeasures. The project developed a protocol in this respect.
- *Emergency Medical Services – Italy:* Getting proper medical attention to injured traffic victims can mean the difference between their surviving

without serious injury or succumbing. Upgrading EMS systems not only will mitigate traffic casualties but also aid in all other medical crises. A methodology for evaluating the quality and effectiveness of such systems was developed as a part of this Project.

- *Experimental Safety Vehicles – United States:* Under the ESV Project of the Pilot Study, seven governments and their automobile industries invested over $150 million in ESV development and supporting research. The resulting exchange of automotive technology is the greatest in the history of the automotive industry. The construction of 13 ESVs by 11 different manufacturers, with varying percentages of government and industry funding, resulted in identifying several critical issues. These issues simultaneously concern the highly complex interrelationships involved in providing improved crash protection for motor vehicle occupants, reduced aggressiveness to the occupants of other vehicles or pedestrians, and reduced vehicle susceptibility to costly property damage in minor low-speed impacts.

Several different types of substantive accomplishments resulted from the seven projects and numerous subprojects.

- *New road safety concepts were accepted.* For example, French engineers defined the "aggressiveness" concept involving a motor vehicle's capability to injure pedestrians or occupants of other vehicles.
- *New road safety perspectives were developed.* For example, the United States now appreciates the importance of "aggressiveness." This is particularly important as increasing percentages of small cars mix with large ones on United States highways. European and Japanese engineers, in turn, have a better appreciation for the benefits in lives saved which can result from vehicles designed to provide better occupant protection.
- *Action program procedures were developed and tested, and are ready for operational use by any nation.* These include protocols for research-type accident investigations, protocols for conducting roadside surveys of alcohol in the breath of drivers, and a methodology for evaluating the emergency medical services available to aid the victims of traffic accidents.

The most important result of the Pilot Study is the large number of recommendations for national and international cooperative action. These recommendations must be implemented if the Pilot Study is to result in lives saved and reduced injuries. The keystone for implementing these recommendations is the International Resolution on Road Safety – in particular, its operative sections whereby members of the Alliance agree to augment or intensify existing road safety action programs and assist each other in substantially decreasing traffic deaths over the next decade. Systematic yet simple procedures are needed to implement the Resolution and the recommendations.

As a result, there is urgent need for an effective mechanism for coordinating and setting priorities for international cooperation designed to improve road safety. If such a mechanism is not created, there is a significant risk that not much in the way of concrete action will result from the Pilot Study work.

Therefore, it was proposed that interested countries, each represented by a high-level technical-policy official, voluntarily organize an ad hoc group to meet periodically to assess the work required to followup on the action recommendations presented in the Pilot Study and Project Reports. The group would:

- Assess the workload required to implement the action recommendations of the Pilot Study.
- Establish priorities and associated schedules.
- Organize, either independently or in existing international organizations, individual ad hoc project efforts with respect to specific problem areas.
- Review progress of these efforts.
- Present periodic progress reports to CCMS at least once a year.

There are no exact precedents in road safety for having a voluntary group coordinating international road safety activity on a flexible ad hoc basis. Further this approach is untested. Nonetheless it has promising potential for assisting the members of the Alliance and other participating countries in setting priorities for international road safety cooperation and making effective those efforts selected for priority treatment. The group could also help CCMS make informed decisions on its followup with respect to Pilot Study recommendations. Such a group could accomplish these tasks without creating international secretariats or standing organizations. The cornerstone recommendation of this CCMS Pilot Study, therefore, is:

- That CCMS strongly encourage members to organize an ad hoc group to coordinate all followup activity on recommendations of the Pilot

Study, and, through its chairman, report progress to CCMS at least once a year.

The Pilot Study effectively exposed many lacunae in the development of preferred road safety technologies and practices. More such lacunae remain, and much work is still to be done. Therefore, it is essential that the participating countries, which have worked so hard to complete the Pilot Study and develop its recommendations, not allow what has been learned to be forgotten. There are too few road safety experts in the world and, more importantly, too many traffic deaths and injuries, not to followup on the recommendations of this Pilot Study in the most cost-effective and timely way.

In summary, the goal called for in the International Resolution on Road Safety is ambitious. But nothing less is appropriate in light of the continuing bloodshed on the highways of the world. The technical actions called for by the projects of the Pilot Study are also ambitious. But ambitious actions are needed if the significant goal is to be realized.

The goal and recommended actions for achieving it, as ambitious as they are, is nonetheless attainable with present road safety technology, imperfect as it is. Although much more knowledge is needed in all aspects of the field, the most important single need is a commitment to put what is already known into practice, to save lives now.

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PART ONE

INTRODUCTION

PART ONE

INTRODUCTION

THE QUALITY OF LIFE

In November 1969, Foreign Ministers of the North Atlantic Council established the Committee on the Challenges of Modern Society (CCMS). They instructed CCMS to address the concern of the industrial nations for quality of life in this final third of the 20th century. They directed CCMS to improve in every practical way the exchange among the allied countries of views and experience in creating a better environment for their societies. The overriding objective was to stimulate government action by members of the Alliance.

THE PILOT STUDY APPROACH

To carry out this mandate, CCMS developed a novel procedure under which one NATO member as "Pilot" assumes the responsibility of managing a particular program. National leadership permits international cooperative efforts to move ahead more quickly and efficiently than under the committee approach characteristic of most such work. CCMS projects also involve high-level officials of the agencies of the participating governments involved with the substance of a particular problem. Policy-level decisions and action commitments are the goals.

THE ROAD SAFETY PROBLEM

At the first CCMS meeting in late fall 1969, the United States proposed to lead a broad pilot study on road safety programs aimed at reducing traffic fatalities. The need for the Pilot Study was self-evident. Nearly one million people were being killed every four years in motor vehicle crashes throughout the world; over half a million of these deaths were in NATO countries.

In 1972, motor vehicles in NATO countries killed approximately 8,000 more people than in 1969, the year that the Road Safety Pilot Study was proposed to CCMS. The increased use of motor vehicles in the last three years with its attendant increased risk provides little comfort to bereaved families of those killed or the millions more seriously maimed, many for life.

Little more has to be said on the tragic scope of this continuing epidemic, and the need for high-level government attention and action.

WORKING PREMISES OF THE PILOT STUDY

The road safety problem was recognized virtually from the start of the motorization era at the turn of the century, and a broad array of countermeasures came into use. Among the well-known forms of action programs to deal with this problem are those aimed at:

- *Driver improvements* through higher standards of education and training, licensing, programs aimed at drunks and other problem drivers, operation of the traffic courts, and development of safe driving practices.
- *Vehicle improvements* through better engineering design, reliability, and production quality control, government regulatory standards for minimum levels of safety performance, motor vehicle inspections, recalls and other programs for correcting safety defects, training and licensing of mechanics, and certification of replacement parts.
- *Road improvements* through higher standards of design for safety – lighting, traffic signals, signs, pavement markings and other controls – maintenance, and identification and correction of hazardous locations.
- *Operational improvements* through higher standards for pedestrian protection, accident investigations and record systems, medical assistance to traffic victims, increased safety belt usage, and public information and propaganda.

From the start, the principal working premise of the Pilot Study was that in these and other road safety action programs much was already known in one country that others could readily and profitably adapt to their needs. Thus, the goal was in part to lay a foundation for more widespread application of action alternatives of proven effectiveness.

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The second premise of the Pilot Study was that progress was not sufficient despite the large number of different types of action programs in use in one form or another throughout the Alliance and elsewhere in the world. A comprehensive approach was required to deal with all elements of road safety in proper relation to each other – the driver, the vehicle, the highway, and operational interactions. Moreover, this comprehensive approach had to be such that each nation could relate the experience of other nations to its own needs, laws, customs and social mores, available resources, and priorities.

Despite the clear need for a comprehensive approach, there is no generally valid underlying theory on which to base such an approach in the road safety field. The road safety operational experience and research findings are comprised of many largely disjointed elements of varying usefulness and scientific soundness. There is no organized array of concepts, principles, theorems, and postulates. There is no rigorously compiled information base on which the relationship between the cost of a given road safety action program and its expected benefits can be determined. In the absence of a unified theory and information base, all governments have had difficulty in deciding which actions to start and when; which of those in use to stop as not producing results commensurate with their costs; and which marginal efforts to continue until conclusively established as being of sufficient or no value.

The third premise of the Pilot Study was that in order to organize disparate information from many countries in a manner that each could draw upon effectively for its own use, it was necessary at a minimum for each country to perceive the problem similarly. And so it was agreed to describe road safety action programs in the context of the single overriding goal of reducing the number of traffic fatalities and maiming injuries by:

- *Accident avoidance* or "primary safety" measures, such as better training of drivers, reducing drunk driving, and motor vehicle inspections.
- *Crash survivability* or "secondary safety" measures, such as better vehicle protection for occupants or reduced "aggressiveness" toward pedestrians.
- *Postcrash* measures that increase the chances of salvaging people seriously injured in crashes, for example, by providing quick and effective medical attention. These, too, may be termed survivability or secondary safety measures.

Both the factors causing traffic deaths or injuries and the action programs for reducing deaths or injuries can be categorized as involving either "primary safety" or "secondary safety." Subcategories with respect to the involvement of the driver, the vehicle, or road conditions can also be set out, and even finer breakdowns are possible. Within this frame of reference, virtually all extant road safety programs can be described along with costs of different levels of effort for each and potential payoffs in reduced deaths and injuries.

It is highly unlikely that the full array of possible road safety programs is being implemented by any single nation. Most nations will concentrate on one group of programs or another, and thus have greater experience and expertise in those programs. Moreover traffic deaths and injuries do not occur in the same way or result from the same causes in all nations, and hence priorities are different. For example, pedestrian fatalities are more prevalent in Europe than in North America, while alcohol-related traffic fatalities may be more of a problem in North America than in Europe. Thus, the problems vary in magnitude among different nations. Where one causative factor might predominate in one location, it might not in another; and road safety programs must be tailored to these conditions.

On the other hand, if all nations use essentially the same mode of analysis, it should become possible to combine operating experiences obtained from diverse approaches and programs. Thus, experience gained from the use of road safety programs in one nation could be made comparable to projected or actual use of such programs in another country. Such an international system of analysis would enable road safety decision-makers in any one country to benefit from the experience of all the participating nations.

A utopian goal might be to organize all road safety information available in each member nation into either of the two general categories of "primary safety" or "secondary safety," or into some other equally systematic frame of reference. This was clearly too ambitious and too long term in this Pilot Study. A more realistic goal was adopted by laying a firm foundation, through carefully selected demonstration projects, for an on-going transfer of technology between governments and industry, as well as a continuing systematic buildup of road safety knowledge after the Pilot Study was over.

PROJECTS COMPRISING THE PILOT STUDY

To initiate the CCMS Road Safety Pilot Study, the United States, as Pilot Country, invited all NATO member governments to participate in a technical meeting in Brussels in March 1970. The countries represented included Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Italy, the Netherlands, Portugal, Turkey, the United Kingdom, and the United States.

A number of different topics were discussed as candidate projects for inclusion in the Pilot Study. Agreement was eventually reached to include seven projects. Each of these projects was designed to deal with one aspect of a comprehensive road safety program under the leadership of one NATO country. Members of the Alliance, as well as nonmembers, could participate in any projects of major interest to them. The projects and their leaders are:

Identification and Correction of Road Hazards – France

Cost-effective identification and correction of dangerous highway locations with bad accident rates.

Motor Vehicle Inspection – Federal Republic of Germany

Identification of vehicles in unsafe condition and their repair or removal from the road.

Pedestrian Safety – Belgium

Alternatives for protecting pedestrians through street layout, vehicle design, education, and training of drivers.

Alcohol and Highway Safety – Canada

Alternatives for dealing with drunk drivers, particularly problem drivers.

Accident Investigation – The Netherlands

Standardized methods for investigating crashes and describing the resulting injuries and vehicle damage.

Emergency Medical Services (EMS) – Italy

Methods for getting proper medical attention to injured motorists.

Experimental Safety Vehicles (ESV) – United States

Demonstration of the technical feasibility of significant advances in automotive safety performance and crash survival through design, development, and testing of experimental motor vehicles.

Each project lead country undertook full management responsibility for all aspects of the work of its project, including preparation of project reports to provide the basis for the treatment of that topic in the final Pilot Study report. It was agreed that each lead country direct its project largely with its own resources, but with some supplementary logistic assistance if needed from the Pilot Country. A common goal for all the projects was to engage in careful scientific analysis and field activities involving specialists and technical staff in order to produce sound action recommendations. All projects accordingly were encouraged to follow essentially the same pattern:

- Formulation by experts of project goals, operational plans and programs to meet them.
- Identification of the responsible officials in the participating nations.
- Detailed technical surveys of relevant technologies, field demonstrations, and other activities embodying the application of experimental technology.
- Workshops, symposia, etc., in which separate experiences gained in experimental demonstrations be exchanged as a basis for developing action recommendations.
- Preparation and submission of project reports to the Pilot Country with recommendations for followup action upon completion of the Pilot Study.

The project reports, reflecting the work and opinion of some of the world's leading experts, contain many recommendations for intensifying or augmenting existing national road safety programs. These recommendations, which any one nation can adopt in whole or part depending on its domestic priorities, can be expected to produce substantial reduction in traffic deaths and injuries.

The recommendations may be divided into two categories, those requiring national action and those requiring international action.

RECOMMENDATIONS REQUIRING NATIONAL ACTION

Beyond the direct savings in lives these recommendations can be expected to produce in each nation that adopts them, several (but not all) of them will have a direct impact on international road safety knowledge. Essentially, if as many countries as possible undertake the same national action, the results of the programs can provide a broad base of working experience that can be compared or combined. These recommendations in many cases require initiating new programs or modifying existing programs so as to follow agreed-upon international protocols. Clearly, the effectiveness of the international effort will depend directly upon the number of nations willing to make the necessary commitments to participate.

RECOMMENDATIONS REQUIRING INTERNATIONAL ACTION

In addition to recommendations for national action related to national priorities or international cooperation, each project presents recommendations for multilateral efforts, such as to harmonize standards, definitions, and operational practices. The most appropriate procedures for implementation will vary from one recommendation to another. For some of the recommendations suggesting the need for harmonizing standards, existing international organizations can perform the work, provided they receive appropriate political and economic support. Other recommendations for multilateral action will require either broadening the mandate of some existing organization or the formation of a new presumably ad hoc effort.

THE INTERNATIONAL RESOLUTION ON ROAD SAFETY[1]

Looking toward the conclusion of the Pilot Study and its various constituent Projects, the members of the Alliance adopted a general commitment in the form of a resolution to take firm action on the recommendations. Under this commitment, embodied in the International Resolution on Road Safety, the Nations of the Alliance resolved:

- "... To use their best efforts to prevent any increase in the annual number of traffic deaths for each class of road user on their road networks over the next five-year period, and thereafter to reduce such number progressively ... "
- "... Each of them to monitor and assess at least every 2 years the results of the action programs mentioned below."
- "... To cooperate in reexamining those programs and the above goal in light of these assessments."
- "... To intensify their existing national road safety programs and/or augment them with action programs that for each member nation are best suited to the problems it will have to solve to meet the above goal, and to exchange with other member nations their action plans as soon as possible but no later than September 1974. . . "

It was agreed that specific action recommendations be adopted by CCMS on a case by case basis.

The first proposals for Implementing Resolutions (IRs) to the overall Road Safety Resolution were expected to stem directly from the completed work of the Pilot Study. Presumably, CCMS action would come comparatively quickly on these proposals which are based upon extensive field work. The alcohol roadside screening protocol proposed by Canada, and the accident investigation protocol proposed by the Netherlands, meet this criterion. In contrast, CCMS action on other proposals might be delayed until additional field work and tests are completed.

Adoption by CCMS of an IR does not necessarily imply that implementation of its international operative paragraphs would be in CCMS. For example, an IR on accident investigation might be directed toward the action programs of individual member nations, while the exchange of the resulting information might be via OECD, ECE, ECMT or some other multilateral organization, or even a nongovernment organization.

It was agreed that participating countries could present additional action recommendations, based upon scientific analysis and corroborating field demonstrations, for adoption by CCMS as IRs to the Resolution, even after the CCMS Pilot Study is completed. In this manner, the Resolution would in time append the agreements of NATO countries on preferred road safety techniques and practices, as well as pinpoint specific needs for additional international cooperation.

ORGANIZATION OF THE REPORT

The final report of the Pilot Study is organized in four parts, plus appendices. The first part is this Introduction.

Part II is comprised of seven sections, one for each of the projects comprising the Pilot Study. Each section presents a synopsis of the problem area and a brief description of the methods used in addressing the problem during the course of the project. The results and principal conclusions are then discussed briefly. Recommendations for national action are presented, followed by recommendations for international cooperation and a proposed IR to the

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[1] Adopted by CCMS on October 24, 1973, approved by the North Atlantic Council on November 28, 1973, and endorsed in the Ministerial Session of that Council on December 11, 1973.

International Resolution on Road Safety. For the most part the materials follow directly from the work as presented in the separate project reports. However some concepts, approaches, and recommendations are expressed that might not be explicitly contained in the antecedent project work. More detailed information is available in each of the project reports which will be published as separate documents.

Part III is comprised of two sections which together address the key matter of modalities for followup activities after the Pilot Study is ended. The first section deals with the recognized need for systematic yet simple procedures to facilitate the implementation of the operative sections of the Resolution, as well as the general exchange of road safety technology among participating nations. The discussion centers on an illustrative format presented in an appendix. The second section of Part III addresses what is probably the most important issue raised in this report, namely, how interested nations acting in concert can coordinate the substantial workload in implementing the many recommendations stemming from the final project reports after the Pilot Study is ended.

Part IV presents a retrospective overview of the Pilot Study, its accomplishments and possible impacts upon national and international road safety.

The Appendices contain tables of International Motor Vehicle Fatality and Associated Statistics, a History of Road Safety Pilot Study and Projects, the International Resolution on Road Safety, the proposed Format for Exchanging Road Safety Action Programs mentioned above, and a listing of reports comprising the Pilot Study.

PART TWO

PILOT STUDY PROJECTS

Identification and Correction of Road Hazards
Motor Vehicle Inspection
Pedestrian Safety
Alcohol and Highway Safety
Accident Investigation
Emergency Medical Services
Experimental Safety Vehicles

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Identification and Correction of Road Hazards

INTRODUCTION

National road transportation systems comprise road networks providing for motor vehicle travel between various parts of a country. Within such systems, different sections or elements of each road have different characteristics and effects with respect to safety, speed, and economy in the movement of people and goods. Other consequences of the specific characteristics of different roads, which have recently received greater attention, include effects on energy, exhaust emissions, noise, and other environmental impacts.

For the past three decades, programs for reducing these undesirable effects tended to emphasize either the addition of entirely new roads to the systems, or major reconstruction of sizeable parts of the road network. The justification for these "system level" improvements is readily evident. Piecemeal modernization could never within a reasonable period of time bring performance up to acceptable levels, particularly with respect to a road network having a large number of locations with characteristics causing high delay or high risk. In general, excellent results have been achieved with numerous types of "system level" highway improvements.

Without minimizing the safety benefits resulting from these massive and ambitious projects, it is a fact that increasing evidence shows the need for greater attention to improving existing roads on a "subsystem" or even "sub-subsystem" basis. For one thing, motorists must continue to travel on existing roads for access to new highways and where modern highways are not available. Furthermore, it is well known that as new super highways become congested, motorists return to the older roads. But, whatever the reasons for continued use of existing roads, uncorrected high-risk locations continue to be the scene of accidents, injuries, and deaths.

Subsystem improvement of sections or elements of existing roads that are deficient in safety or other respects (i.e., "spots") is dependent to a great extent on their precise identification. While older highways normally deserve the greatest attention, high-risk locations (sometimes referred to as "black spots" or "spots") frequently are discovered on modern super highways. The initial design may not have been correct, or the conditions of use may have changed from those for which the design was originally intended. Road locations pinpointed as high-risk can be improved in several different ways: improvement of routine maintenance, addition of street lighting, better traffic signs and markings, or perhaps some minor construction or reconstruction to eliminate a specific condition, such as a dangerous curve or slippery pavement. All of these corrections are low in cost when compared to building totally new roads. Nevertheless, because of the very large number of road locations with safety deficiencies, the aggregate cost of "spot" corrections is huge.

Modern highways save many lives, but cost large sums to build. Corrections of high-risk deficiencies in road locations on existing highways also save many lives, and also cost large sums in the aggregate to complete. Each approach competes for funding from the same sources of revenue. The treatment of existing hazardous locations in the "subsystems" means the construction of fewer miles of new highways, and vice versa. Decision makers generally agree that a balanced approach to providing a safer road system requires both "spot" corrections and more modern highways. But their views differ on how road budgets should be divided between the two; a central issue to be resolved.

The CCMS Road Hazards Project was organized to study this problem, particularly as it relates to identification and treatment of high-hazard locations on existing roads. A prime goal was to develop broad factual justification for financing safety improvements of hazardous road sites. This justification was to be based on an exchange of experience among nations having programs in this area. It was envisaged that improved techniques would be developed for establishing priorities with respect to which high-risk sites should be corrected first, and in what manner. Such techniques would in turn materially aid officials to decide how to divide available funds between construction of new roads and correction of high-risk locations on existing roads.

METHOD

France, which for some 15 years had a systematic program for the identification and treatment of road hazards, accepted the leadership of this Project for CCMS. To start the effort, French experts prepared a detailed questionnaire containing 65 items of inquiry organized into four parts:

1. Identification of Road Hazards.
2. Correction of Road Hazards.
3. Project Effectiveness Study.
4. General Comments.

The questionnaires were sent to policy-level highway administrators in most of the countries having large numbers of registered vehicles. Replies were received from Belgium, Canada, Denmark, the Federal Republic of Germany, France, Ireland, Italy, the Netherlands, the United Kingdom, and the United States. After the replies were analyzed, a seminar was held in Paris, April 28, 1972, to discuss the main findings. The meeting included representatives from essentially all the countries that responded to the questionnaire.

Following the seminar, the French and Belgians incorporated results of the discussions into a draft report which was used as a working paper for the 11th International Study Week on Traffic Engineering and Safety, convened in Brussels, Belgium in September 1972. This study week, with "Identification and Correction of High-accident Locations" as its major theme, was attended by some 800 experts from 42 countries, and represented an excellent forum for still more discussion of the findings obtained in the earlier questionnaire distributed as part of the CCMS Project. The final Project Report is thus derived from an unusually broad base of expert opinion and commentary.

DISCUSSION

Methods for assessing the benefits in lives saved as a result of the corrective treatments of high-risk road locations vary widely among countries. However, it is agreed that the payoff in lives saved resulting from such corrective treatments is very high. For example, a road improvement in France costing $100,000 saved on the average of one or two lives during the year following the improvement. In California, investigators reported that a $304,000 program of corrective treatments (each of which cost less than $5,000) produced a yearly decrease of about 20 deaths; a $5,200,000 program ($5,000 to $10,000 treatments) saved 25 lives.

Despite the very high payoff in lives saved per dollar invested, these programs of comparatively low-cost corrective treatment rarely had the same public appeal or political support as new road construction programs. It would appear, therefore, that decisions to increase the availability of highway funds for the less politically visible "subsystem" treatments must be made at the policy level.

To support such high-level decisions, however, much better methods are needed for identifying high-risk locations, for determining alternative treatments for reducing the risk, and for forecasting the number of lives that each treatment can be expected to save. Carefully planned and energetically implemented corrective programs and cooperation among interested nations will materially aid in developing these methods with the urgency the program deserves.

PRINCIPAL CONCLUSIONS

The value of a systematic program for identifying and correcting high-risk road sections has been corroborated by many of the world's leading safety experts. Accordingly, it is indicated that each member of the Alliance should establish appropriate new programs or intensify existing programs in this area. It is further indicated that CCMS members should cooperate with each other and with non-CCMS members in developing and validating new methods for improving the effectiveness of their respective programs. This accelerated international cooperation will bring important refinements to the development and validation of methods for forecasting the traffic safety output of any given improvement contemplated.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. *That each nation establish new programs or intensify existing ones for identifying and correcting high-hazard locations in its road network. The program should include, but not be limited to:*

- Procedures for identifying hazardous locations (a priori and a posteriori).
- Alternatives for treatment (correction) of each class of hazardous location.

- Procedures for forecasting accident reductions that alternative treatments will produce.
- A cost-effectiveness methodology for selecting the "best" set of improvements, "best" being established by considering jointly the cost of the improvement and the forecasted accident reductions in lives saved.
- Procedures for assessing the effectiveness of each improvement made. Such procedures would compare the achieved reductions in accident losses with the forecasts.
- A general policy on the allocation of funds between corrections of existing hazardous locations and construction of new highways.
- A general policy that defines responsibilities between all levels of government (federal, state and local) for each of the various aspects of a comprehensive program for road hazards identification and correction.
- A general policy requiring a continuous review of all highway safety improvements to determine the success or failure in reducing accidents, deaths, and injuries.

2. *That each nation organize new or improve existing systems for the collection, storage, retrieval, and analysis of highway accidents and exposure data to meet the needs of all the aforementioned elements of a road hazards identification and correction program. The systems should include:*

- A system to classify different types of road hazards, to assign the risk to each class, and to identify alternative corrective treatments with the cost of each and the accident reductions it is expected to produce.
- A comprehensive accident records system capable of serving the data needs of all agencies engaged in programs related to the reduction of highway accidents.
- The use of standard definitions established and adopted nationally for: accident type, causal factors, type of collision, extent of injuries, and description of accident locations.
- The use of procedures established to identify the site of the accident in a manner that is consistent with records systems used by highway agencies for other functions, e.g., highway maintenance records.
- The use of provisions for obtaining "exposure" data (such as traffic volume counts, speed distributions, etc.). This data, in combination with accident data, would establish risks at any location.
- A minimum required level of accident reporting established at all levels of government to support the generation of a fully representative data base on which to develop reliable national statistics, and perform appropriate statistical analyses.
- The use of provisions to have accidents investigated by properly trained police officers. Additional provisions should be made for police investigators to be supplemented in a selected sample of accidents by teams of specialists in the several different factors (e.g., highway, vehicle, driver, environment) that can culminate in an accident. Appropriate training programs should be established both for police and specialist investigators.
- The use of appropriate statistical methods (e.g., Poisson distribution, regression analysis) for interpreting historical data and forecasting the saving of lives with each projected "spot" improvement.

3. *That each nation intensify its research and continuously upgrade the methodology used for a priori identification of road hazards and for forecasting the effectiveness of corrective treatments. Specific objectives would be:*

- Better sampling and statistical methods to improve the accuracy and precision of forecasts.
- Procedures to change forecasting methods to reflect new types of highway improvements and changes in driver characteristics, automobile performance, etc.
- Procedures to adjust the forecasting methods to meet different local conditions, such as climate, terrain, traffic flow characteristics, and congestion.
- Procedures to incorporate into forecasting models more pertinent variables on highway geometrics, traffic control devices, and other factors present in accidents.

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

1. That interested nations agree to cooperate in developing a model program for the identification and correction of road hazards which would facilitate information exchange. The model would comprise standards, definitions, and operational protocols for all aspects of a comprehensive program as described in the preceding recommendations for national action. The workload in developing and testing the model program would be divided in some appropriate fashion, and any existing organization having the

capability and interest to undertake the needed development of some aspect of the model program would be strongly encouraged to do so.

2. That interested nations agree to initiate procedures for systematically exchanging information and operating experiences on their respective programs for identifying and correcting road hazards. The exchange would pertain to the existing programs at the outset. As agreement is reached on given aspects of the model program, and various nations adopt them, the exchange would deal with them.
3. That interested nations agree to organize an international workshop meeting to initiate this program.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON ROAD HAZARDS IDENTIFICATION AND CORRECTION

Date:

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that there are certain areas in all road networks containing road hazards where inordinately high numbers of crashes occur causing deaths and serious injuries;

Considering that benefits in lives saved and injuries prevented per unit cost of road hazard correction are often greater than such safety benefits per unit cost of new road construction;

Considering that, despite this high safety return on the investment in correcting road hazards, in most jurisdictions, the aggregate resources needed for correcting known road hazards far exceed available funds;

Considering that accurate forecasts of the potential number of lives saved and injuries prevented, as the result of individual road hazard corrections per unit cost of such corrections, will aid in assigning priorities and allocating available resources;

Considering that the exchange of information among governments on the identification of road hazards, techniques for correcting them, and assessments of the results of such corrections will aid each in establishing its priorities; and

Considering that this exchange will be mutually facilitated if all cooperating governments use similar protocols in describing their programs;

Do Hereby Resolve:

1. To develop, in concert with each other and with some appropriate division of workload, a model program for the identification and correction of road hazards. The model would be comprised of standards, definitions, and operational protocols for all aspects of a comprehensive program, including but not limited to:
    - procedures for identifying hazardous locations (a priori and a posteriori)
    - alternatives for treatment (correction) of each class of hazardous location
    - procedures for forecasting accident reductions that alternative treatments will produce
    - a cost-effectiveness methodology for selecting the "best" set of improvements, "best" being established by considering jointly the cost of the improvement and the forecasted accident reductions in lives saved
    - procedures for assessing the effectiveness of each improvement made. Such procedures would compare the achieved reductions in accident losses with the forecasts, and would provide data for improving the procedures for forecasting and assessing cost-effectiveness
    - a policy on the allocation of funds between corrections of existing hazardous locations and construction of new highways
    - a policy that defines responsibilities between all levels of government (federal, state and local) for each of the various aspects of a comprehensive program for road hazards identification and correction
    - a policy that requires a continuous review of all highway safety improvements to determine the success or failure in reducing accidents, deaths and injuries;
2. Each to initiate intensification of the above elements in its current program for the identification and correction of road hazards without waiting for a model program to be agreed upon; and
3. Each to incorporate into its program, to the fullest extent practicable, elements of the model program as agreement is reached.

Motor Vehicle Inspection

INTRODUCTION

Today's drivers must be constantly prepared to react to unexpected situations in order to prevent serious accidents. Therefore, it follows that vehicles operated on public roads must be in a safe working condition at all times and perform properly in these unexpected situations. For example, a properly functioning brake system could be the only difference between life and death for a pedestrian who steps in front of a vehicle traveling even at relatively low speeds. In this and other traffic crises, malfunctioning of such critical vehicle components as brakes, steering, suspension, and tires represents a major threat not only to the vehicle's occupants, but also to the occupants of other vehicles and to pedestrians. Thus, the condition of vehicles on public thoroughfares is a matter of public concern.

The need for proper maintenance of a vehicle is a matter of common knowledge. Even with normal usage, different parts of a vehicle are subject to gradual wear, maladjustment, and deterioration. However, preventive maintenance and corrective repairs historically have been inadequate, and substantial numbers of vehicles are operated on public thoroughfares in an unsafe condition.

As a result, many countries have enacted laws that require all vehicles to be inspected periodically by government inspectors or other technicians duly licensed by the appropriate government body. Knowing that his vehicle is subject to government scrutiny for safety obviously presents a motorist with a strong incentive to keep his vehicle properly maintained. Furthermore, the inspection itself, if properly performed, detects unsafe components in need of repairs. Such inspections also indicate marginally satisfactory conditions which if unattended can become dangerous.

These justifications for motor vehicle inspections have been known for many years, and various opinion polls (e.g., in Belgium and in France) have shown that the public supports this need. Most experts also accept this, but based on heuristic judgments rather than hard, quantitative data. Indeed, few concrete conclusions can be drawn from the available data. Thus, estimates as to the number of accidents in which vehicle defects can be listed as a causative factor, range from 6 to 18 percent. Almost no data are available on the number of accidents that were averted because some defect identified in an inspection was corrected.

The difficulty is readily seen in numerically describing the positive results of motor vehicle inspections or, for that matter, any other accident avoidance or primary safety action. While one can readily count the accidents that occur, it is virtually impossible to count the accidents that were averted. The motorist might know that because of recently repaired brakes he was saved from having an accident, but this fact never appears in any official statistical summary.

Despite these inherent difficulties in obtaining precise data relevant to the justification of motor vehicle inspection, it is nonetheless important to continue the search. Maintenance and corrective repairs cost money, as do inspections for detecting the need for such repairs. Costs for labor and parts are increasing. Within the context of increasing costs of car ownership in general, the public might well become more concerned with inspections that seemingly call for only unimportant repairs. No less a problem is the quality of the repairs, once a need for such repair is identified by inspection.

The situation with regard to motor vehicle inspection thus is one of widespread subjective opinions on its importance to safety, and not very much "hard" data on the positive results produced in relation to its costs. The CCMS Project was accordingly organized to study this issue which is of central importance to government action, namely, safety benefits produced by motor vehicle inspection versus its costs.

At about the same time that the CCMS effort was started, the International Committee for Technical Inspection (CITA) was founded with delegates from 17 countries. The principal aim of this Committee is to promote international collaboration to increase understanding of problems relating to compulsory inspection of motor vehicles. Among the goals are standardization of inspection methods, inspection equipment, and criteria for the approval or rejection of vehicles during inspection.

Thus, while CITA concentrated on technical and administrative problems associated with upgrading the quality and reliability of the inspections, the CCMS effort addressed the issue of how to establish more rigorously the importance of quality inspection to safety. Both programs proceed apace and in concert, and the results of both efforts are needed in planning government actions.

METHOD

Because of its particular interest and long involvement in motor vehicle inspection, the Federal Republic of Germany agreed to lead this Project. German and United States experts started early in 1971 by preparing a questionnaire concerning the inspection programs of the various NATO countries participating in the Project. This was followed by a meeting of all project delegations in Cologne in December 1971 to discuss the German motor vehicle inspection system and to visit the commercial and official motor vehicle inspection related facilities.

Subsequently, the German project leaders summarized the responses to the questionnaire. Following this analysis, the participants from Belgium, Denmark, the Federal Republic of Germany, the United Kingdom, and the United States prepared a description of motor vehicle inspection in their respective countries. The description included a discussion of the justification and experience of each aspect of the motor vehicle inspection program in the country preparing the report. In addition to the nature and scope of the given program, the description covered the following topics: legal provisions, quality control, compulsory and voluntary measures, defect recall programs, frequency of inspection, institutions in charge, fees, collection and use of data, qualification and training of personnel, use of inspectors and supervisors, use of automated inspection, and consumer interest.

DISCUSSION

The logical justification for motor vehicle inspection is readily described: critical components of the vehicle are going to wear and deteriorate; they must be maintained and repaired to minimize the damage to the occupants of the vehicle and those in other vehicles or pedestrians; owners are usually not technically qualified to identify the need for repairs or assess the adequacy of completed repairs; thorough vehicle inspections are needed both to protect the owner and the general public.

Notwithstanding seemingly incontrovertible logic in its support, motor vehicle inspection is subject to much questioning and controversy regarding both its technology and its benefits. Both are closely interrelated; better inspection techniques should result in lives saved by better identifying needed repairs before they cause accidents. Better inspection techniques should reduce the likelihood that owners will be required to spend money on unnecessary repairs. Modern technology can guard against "under-inspection," that is, failure to detect an unsafe condition, and "over-inspection" which requires owners to complete unnecessary repairs.

It is clear, therefore, that there is and will continue to be a significant need for coordinated activity to develop better inspection technology, (i.e., inspection criteria more closely related to accident causation, better inspection equipment, better trained inspectors to operate the more sophisticated equipment, and better operational practices of inspection stations) so as to minimize cost and inconvenience to car owners. This need is recognized and is being attacked most actively by CITA in its various studies aimed at standardization.

Perhaps the most important emerging need for international cooperation relates to automated diagnostic equipment in inspection stations and equipment built into vehicles at the factory to facilitate the use of this diagnostic equipment. If the automated diagnostic equipment were to require a special connector to the critical components of the vehicle, the need for standardization of equipment in the stations as well as connecting points on the vehicle are obvious.

The foregoing and other technical problems regarding the substance of inspection programs are important to safety and automotive economics. They are amenable to solution, particularly with concerted international coordination. The need which is not as yet being met, at least not on any systematic basis, is the establishment of quantitative relationships between improvements in vehicle condition following inspection and the frequency and seriousness of accidents caused by vehicle defects. While the costs of inspections and subsequent repairs are known, little is known as to the safety benefits that these expenditures provide.

Numerous explanations for this situation are offered. Official accident statistics continue to show a low percentage of accidents clearly due to vehicle defects. This may reflect correctly that vehicle defects do not play a major role in accident causation. On the other hand, what is more likely is that the data are not being collected properly. The policeman who investigates an accident normally has insufficient technical training to recognize where vehicle defects contributed to the causation of the accident. If he has had this training, the chances are that he will neither have the time nor the means to assess the true condition of the vehicle at the scene of the accident. It is a virtual certainty that many accidents due to vehicle defects are never identified. Hence, the percentage of accidents caused by vehicle defects is omitted from official statistics simply because this causal possibility is not noted as such in the initial accident report. Official accident statistics are not, therefore, a final argument for or against the value of motor vehicle inspection as a safety measure.

There have been numerous attempts to prove the effectiveness of motor vehicle inspection in reducing road accidents and casualties, but none is yet conclusive. Special accident investigations were mounted in various countries with investigators trained to recognize vehicle defects contributing to an accident. These special investigations are beginning to indicate a much higher involvement of vehicle defects in causing accidents than heretofore suspected. But reliable comparisons cannot be made because the previously collected data were not collected within the context of seeking information on linking vehicle defects to accidents.

PRINCIPAL CONCLUSIONS

There is a continuing need for international cooperation in upgrading various aspects of motor vehicle inspection technology. Better technology will improve inadequate inspection programs that otherwise permit unsafe vehicles to be operated on public thoroughfares. It will also guard against subjective and overly strict inspections which cause owners to pay for unnecessary repairs.

International standardization, which is now the goal of CITA, will be most valuable in upgrading the quality of inspection equipment, in training technicians in the operation of the more sophisticated equipment, and in improving inspection station management. An important emerging need for international standardization relates to automated diagnostic equipment in inspection stations and repair garages. Apart from safety inspection, standardization of automated diagnostic equipment is also highly important for exhaust emission inspections which clearly should be made concomitantly with safety inspections. The United States is currently planning a Motor Vehicle Inspection Demonstration Program which will combine these inspections. Belgium has combined these inspections since January 1, 1973, for gasoline powered vehicles and since 1964 for diesel fueled vehicles.

The most important need in motor vehicle inspection, however, is to develop and implement better methods for determining if defective mechanical, electrical, or hydraulic conditions have greater involvement in accident causation than heretofore suspected. If this is found to be the case, it will be necessary to develop methods for determining if current motor vehicle inspection reduces this involvement, or if new motor vehicle inspection techniques are needed.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. *That each nation support appropriate programs for assessing the condition of primary safety components of all vehicles operated on public thoroughfares.*
   - The primary safety components to be evaluated through appropriate inspections include brakes, tires, steering suspension, chassis and lighting.
   - Each of these component systems should be assessed for passenger cars, trucks, busses, and motorcycles.
   - The assessments should be on the condition of the vehicle as indicated by the initial inspection (and not reinspection upon failure to pass previous inspections) and should be identified as either fail (repair required), marginal (repair advisory) or pass.
2. *That each nation, on a sampling basis, support programs for establishing the relationship between defects and accidents, inspections and accidents, and environmental and economic benefits, resulting from inspections and repairs.*
3. *That each nation initiate programs for the technical development of efficient inspection equipment and methods.*
4. *That each nation initiate appropriate programs or augment existing ones to train special investigators and police investigators to recognize the presence of deficiencies in a vehicle involved in an accident.*

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

- That interested nations agree to work together in an appropriate international organization or otherwise to examine the feasibility of standardizing automated diagnostic equipment.

The automated diagnostic inspections would include safety and exhaust emissions.

- That if the feasibility of standardizing diagnostic equipment is established, interested nations cooperate in developing proposals for the substance of such standards and, upon reaching a consensus, each incorporate the standard into its regulatory requirements.
- That interested nations agree to cooperate to achieve broader standardization of all aspects of motor vehicle inspection programs including but not limited to inspection equipment, training of inspectors and technicians, criteria for accepting or rejecting a vehicle as safe, and inspection station management.
- That interested nations agree to cooperate in the development of new methods for assessing vehicle defects as a cause of traffic accidents, implementing these new methods, and exchanging the results of these efforts.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON MOTOR VEHICLE INSPECTION

Date:

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that accident investigations indicate that 6-18 percent of all accidents result at least in part from vehicle defects;

Considering that motor vehicle inspection programs are designed to pinpoint vehicles with deficiencies likely to cause or contribute to accidents;

Considering that inspection programs must seek to avoid "over-inspection" which will impose undue costs and inconvenience on the car owner and "under-inspection" which will permit dangerously defective vehicles to be operated on public thoroughfares;

Recognizing that, while motor vehicle inspections can be justified on safety, environmental, and economic grounds, there is no general agreement on the cost-benefit relationship between enhanced road safety and a comprehensive motor vehicle inspection system; and

Regarding the Motor Vehicle Inspection Project led by the Federal Republic of Germany as part of the NATO CCMS Road Safety Pilot Study as having established the need for continuation of inspection programs with continuing evaluation of cost benefits;

Do Hereby Resolve:

1. To refine and implement on a sampling basis as a part of their national accident investigation and motor vehicle inspection programs, procedures designed to show:
    - the relationship between vehicle defects and accidents, and inspection and accidents
    - environmental and economic benefits resulting from motor vehicle inspections and repairs generated by inspections;
2. To initiate programs for the technical development of efficient inspection methods and equipment; and
3. To work jointly with other nations in an appropriate international organization or otherwise to:
    - seek greater standardization of various aspects of motor vehicle inspection such as equipment, training of technicians, criteria for measuring the safe or unsafe condition of a vehicle component, and inspection station management
    - develop systems for exchanging the information developed in paragraphs 1 and 2 above.

Pedestrian Safety

INTRODUCTION

On a worldwide basis, a very important number of road accident fatalities are pedestrian. Nevertheless, the proportion of pedestrian fatalities to other traffic fatalities varies between countries. In the United Kingdom, for example, upwards of 34 percent of the traffic fatalities are pedestrians; in the United States, the comparable statistic is 19 percent. As improvement of crash protection to vehicle occupants continues in the future, the proportion of pedestrian casualties will be substantially larger. Thus, the need to include action programs to upgrade pedestrian safety is obvious and urgent.

The classes of pedestrians who suffer most of the casualties include young children and the elderly. Dr. Mackay reports that in the United Kingdom one-third of the serious pedestrian casualties are under 10 years of age, with a preponderance of females over males. The elderly are also very much involved, with females predominating over males in a ratio of some three to one for fatalities over 65 years of age. Similar proportions are found in the United States.

Although much better data are required, certain dimensions of the pedestrian safety problem are known, and numerous practices are used to reduce pedestrian casualties. Some examples of these practices are:

1. Codes and regulations regarding design and placement of pedestrian crossings; regulatory requirements for driver and pedestrian behavior and enforcement programs.
2. Education and training programs to familiarize drivers with pedestrian problems and pedestrians with driver problems.
3. Specific programs to protect children and the elderly.
4. Land use planning and urban design to provide safer pedestrian movement.

Many of these practices are widespread, even though there is a paucity of data corroborating their effectiveness. Moreover, very little data exist that portray the cost-effectiveness of any particular practice when taken by itself or in comparison with other practices.

The foregoing are measures aimed at improving pedestrian safety by reducing the likelihood of vehicles striking pedestrians. In general, the overwhelming majority of government actions throughout the world to reduce pedestrian casualties falls into this category of "primary safety" or accident avoidance. Little, if any, attention is directed toward employing "secondary safety" approaches aimed at changing the vehicle design so that when it strikes a pedestrian it is less likely to kill or maim him.

Since the inception of United States Federal programs in road safety in 1966, United States national policy has been directed toward improving secondary safety for vehicle occupants. The payoff in this approach is now a matter of public record. For example, one study reports that driver fatalities per crash are 20 percent lower in newer vehicles which meet secondary safety regulations than in older vehicles built before these regulations came into effect. One might speculate that with similar emphasis upon secondary safety, gains of this magnitude in pedestrian safety might also be obtained.

It can be seen that many different action alternatives, both in primary and secondary safety, might be adopted by governments in whole or part to reduce pedestrian casualties. The Pedestrian Safety Project was organized to identify these alternatives and their comparative cost-effectiveness based upon examination of operational experiences and published research findings.

METHOD

The Pedestrian Safety Project was initiated under Belgian leadership with the first meeting of experts held in Brussels in September 1971. Member nations represented were Belgium, Denmark, France, the Federal Republic of Germany, the Netherlands, Turkey, the United Kingdom, and the United States. Also present was an observer from Japan.

It was decided at this meeting to divide the project into a group of constituent topics, each of which would be the responsibility of one or more experts. For each topic, the expert would appraise the field and, at the conclusion of the project, report on measures already in use and on those that could be profitably used in the future. As work progressed, the array of topics under study was modified somewhat as follows:

Pedestrian Safety Statistics (Belgium)

Extent of the pedestrian safety problem; numbers of pedestrian casualties including fatalities and serious injuries; pedestrian death rates and other risk measures.

Human Factors (The Netherlands and United States)

Safe and unsafe behavior of pedestrians; safe and unsafe behavior of drivers; training programs and instructional manuals for parents; public information and propaganda and legal regulations.

Vehicle and Biomechanics (United Kingdom)

Design of vehicles to limit front-end aggressiveness to the pedestrian, including the resulting trade-offs in reduced occupant protection, and increased vehicle damage and repair costs.

Micro-Environmental (Federal Republic of Germany)

Pedestrian crossings in streets with or without traffic signals; street lighting; parking restrictions; pedestrian tunnels and overpasses.

Long-Term Urban Planning (Denmark and Sweden)

Urban design for pedestrian safety; zoning; separation of pedestrian and vehicular travel paths; exclusion of vehicles from areas with high levels of pedestrian movement.

To facilitate obtaining information on the topic under study, each expert prepared questions on his topic and submitted them to the Project Leader. The questions on all topics were assembled into a single questionnaire which was distributed to all participating nations.

The second meeting of the Pedestrian Safety Project was held in Copenhagen, June 1972. The responses to the survey questionnaire were evaluated and several preliminary technical papers were presented by the experts. After reviewing the paper on pedestrian safety epidemiology by Dr. Mackay, the group agreed that specifications in the experimental safety vehicle program designed to protect pedestrians were not necessarily incompatible with those designed for occupant protection and should be stressed to a greater extent that those concerning reduction of property damage. The group proposed that a recommendation be presented to the next CCMS Plenary Session calling for ESV specifications to reflect impact tolerances that protect pedestrians when hit by cars at relatively low speeds.

The final meeting of the Project was held in June 1973 in London where final Project recommendations were drafted.

In addition to these Project meetings, a group of experts visited several experimental demonstrations of pedestrian safety in progress in the United States.

DISCUSSION

The scope of the pedestrian safety problem is well-known throughout the world and although the proportion of traffic casualties who are pedestrians varies widely, pedestrian protection is nonetheless one of the most serious aspects of the road safety problem everywhere.

Numerous measures are in use to reduce these casualties. A general problem throughout is that little is known about the effectiveness of any single measure. Unmistakably clear is the need to develop and validate better methods for assessing the reductions in casualties that specific measures will produce.

The absence of conclusive data on countermeasure effectiveness is not, however, a compelling argument for not implementing measures that experts judge to be important. For example, one need not be an expert with volumes of supporting data to conclude that traffic signal settings should allow pedestrians enough time to cross streets at a reasonable walking speed.

Based upon the work in the Project, it appears that many governments, although fully cognizant of the seriousness of the pedestrian safety problem, do not assign it commensurate priority. Governments often fail to implement measures that can immediately reduce casualties, as well as undertake research and demonstrations of new methods.

In general, responsibility for pedestrian safety is dispersed throughout many different agencies at different levels of government and this responsibility is often given secondary or even lower priority. While pedestrian safety can often be a corollary activity in police, traffic engineering, education, health, and other agencies, it nonetheless needs to be given greater priority and visibility.

As spotty as the existing programs appear for reducing pedestrian casualties through "primary safety" measures aimed at reducing the likelihood of pedestrian-vehicle accidents, "secondary safety" initiatives to reduce vehicle front-end aggressiveness upon striking a pedestrian are even more limited if not nil for all practical purposes. Much more attention is required in this respect.

Comparatively little is known about how the front end of a vehicle can be designed so as to be less lethal to the pedestrian. Nor is there an adequate theory as yet, or even a base of information from which to develop and validate a theory, on the interrelationships between front-end design for pedestrian protection, occupant protection, and reduction of property damage. Without deprecating the importance of the latter two requirements, and with full recognition of the natural human reaction to equating reductions in property damage to savings of life, it nevertheless is clear that front-end design to effect pedestrian protection has not received the same level of consideration.

GENERAL CONCLUSION

Pedestrian safety represents a very significant part of the road safety problem, and, in general, is not receiving attention commensurate with the number of pedestrian casualties that nations continue to experience.

Although there are, unfortunately, no guarantees of payoff, the magnitude of those casualties dictates much higher levels of national commitment to the problem. Such higher commitment should involve both primary and secondary safety approaches.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. That each nation designate a single official to be responsible for its pedestrian safety program or at a minimum to be cognizant of the various interrelated programs that are directed toward reducing the number and severity of pedestrian casualties. These include programs with respect to public works and traffic engineering, police traffic enforcement, ordinances and regulations, education and public information, zoning and urban planning, and vehicle safety regulations. Such a person would serve as a contact point and communications link at the working level with counterpart technical officials in other countries to coordinate information exchange and planning for cooperative development and demonstration.
2. That each nation develop and implement programs for systematically assessing the magnitude and causes of the pedestrian casualty problem. An appropriate data collection and statistical analysis procedure designed specifically for these purposes is mandatory to meet this requirement.
3. That each nation intensify or otherwise improve the effectiveness of its pedestrian crossing systems and pedestrian safety regulations; particularly with respect to evaluating new or unproven systems, to achieving greater uniformity, and assuring good enforcement of regulations found to be effective.
4. That each nation initiate measures to ensure that in seeking to reduce delay and congestion in urban areas, officials consider the extent to which these alternatives increase or reduce hazards to pedestrians.
5. That each nation initiate a national program to educate, train, inform, and otherwise upgrade the awareness of local government officials of the implications of their work to pedestrian safety. Such a program should also seek support of these officials for intensified efforts in this regard.
6. That each nation augment or initiate new programs of training, education, and publicity with respect to behavior which will improve pedestrian safety. These programs should be targeted as specifically as possible to different types of audiences.
7. That each nation establish as a matter of national policy that an assessment be made of its effectiveness in reducing pedestrian casualties, before any new road safety improvement program for training, education, or publicity is initiated.
8. That each nation establish a national program to ensure full consideration of pedestrian safety requirements in the planning of new towns and urban redevelopments.
9. That each nation adopt as national policy the position that front-end motor vehicle design which minimizes pedestrian injuries carries higher priority than designs which reduce vehicle damage in minor crashes at low (e.g., parking lot) speeds. Further, it should also be adopted as national policy that such design should be accorded at least the same priority as that which minimizes injuries to vehicle occupants.
10. That, in conjunction with placing a high priority on front-end motor vehicle design to minimize pedestrian injuries, each country modify any existing or proposed regulations that

unreasonably compromise pedestrian protection in favor of reduced vehicle property damage or higher levels of occupant protection.

11. That each nation, in cooperation with its automotive industries and research community, seek optimum solutions for vehicle front-end designs that both protect pedestrians and vehicle occupants and minimize property damage to the vehicles in low-speed impacts.

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

1. That interested nations agree to examine together or to renew their efforts to examine together the effectiveness and applicability of their existing and proposed rules and regulations relevant to pedestrian safety, and to develop a set of rules and regulations of optimum effectiveness with a view to their eventual adoption.
2. That interested nations agree to cooperate in developing and implementing a model national program for developing and maintaining a statistical base on which the magnitude and nature of the pedestrian safety problem and the effectiveness of pedestrian safety activities could be assessed.
3. That interested nations agree to cooperate in initiating cooperative development and demonstration projects in pedestrian safety, evaluating the effectiveness of such demonstrations, and exchanging the resulting data.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON PEDESTRIAN SAFETY

Date:

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that in many nations pedestrian injuries and fatalities are a sizable proportion (12 percent to 34 percent) of the road safety problem;

Considering that a significant effort is given to traffic management and urban transportation planning with the objective of moving vehicular traffic more swiftly, but not enough attention given to the safety of pedestrians;

Considering that despite its relative importance in overall road safety, pedestrian safety does not receive enough attention from the government and industrial sectors;

Considering that action in at least eight major areas can enhance pedestrian safety: (1) resource allocation proportional to the problem, (2) education, training, and public information, (3) comparative evaluation, uniform adoption, and adequate enforcement of selected pedestrian safety systems, (4) environmental planning and design, (5) vehicle design, (6) accident data and research, (7) official and public support, and (8) international information exchange;

Recognizing that few existing pedestrian safety systems and programs have been evaluated for their effectiveness, and that research on pedestrian behavior and safety has been limited;

Recognizing that there are differences among the nations regarding pedestrian regulations, enforcement levels, and other programs; and

Regarding the Pedestrian Safety Project led by Belgium as part of the NATO CCMS Road Safety Pilot Study as having clearly demonstrated the need to couple intensified pedestrian safety action programs with systematic procedures to assure their effectiveness;

Do Hereby Resolve:

1. To designate a single official to be responsible for pedestrian safety programs or at a minimum to be cognizant of the various interrelated programs that are directed toward reducing the number and severity of pedestrian casualties. These include programs with respect to public works and traffic engineering, police traffic enforcement, ordinances and regulations, education and public information, zoning and urban planning, and vehicle safety regulations. Such a person would serve as a contact point and communications link at the working level with counterpart technical officials in other countries to coordinate information exchange and planning for cooperative development and demonstration;
2. To develop and implement programs for systematically assessing the magnitude and causes of the pedestrian casualty problem. An appropriate data collection and statistical analysis procedure designed specifically for these purposes is mandatory to meet these requirements;
3. To review their road safety budget and resource allocations both in research and current measures with a view toward allocating to pedestrian safety a share of resources proportionate to the extent of the problem contributed by pedestrian casualties;
4. To intensify or otherwise improve the effectiveness of their pedestrian crossing systems and pedestrian safety regulations; particularly with respect to evaluating new or unproven systems, to achieving greater uniformity, and assuring good enforcement of regulations found to be effective;
5. To initiate measures to ensure that in seeking to reduce delay and congestion in urban areas, officials consider the extent to which these alternatives increase or reduce hazards to pedestrians;
6. To augment or initiate a program to educate, train, inform, and otherwise upgrade the awareness of local government officials of the implications of their work to pedestrian safety, and to secure their support for intensified efforts in this regard;
7. To augment or initiate new programs of training, education, and publicity on behavior which will improve pedestrian safety, such programs to be targeted specifically to several different types of audiences;
8. To establish as a matter of national policy that an assessment be made of its effectiveness in reducing pedestrian casualties before any new road safety improvement program for training, education, or publicity is initiated;
9. To establish a national program to ensure full consideration of pedestrian safety requirements in the planning of new towns and urban redevelopments;
10. To adopt as national policy the position that front-end motor vehicle design which minimizes pedestrian injuries carries higher priority than designs which reduce vehicle damage in minor crashes at low (e.g., parking lot) speeds. Further, it should also be adopted as national policy that such design be accorded at least the same priority as that which minimizes injuries to vehicle occupants;
11. To modify any existing or proposed regulations that unreasonably compromise pedestrian protection in favor of reduced vehicle property damage or higher levels of occupant protection;
12. To seek optimum solutions for vehicle front-end designs that both protect pedestrians and vehicle occupants under otherwise lethal impacts;
13. To mutually examine the effectiveness and applicability of all existing rules and regulations relevant to pedestrian safety, to develop a set of rules and regulations of optimum effectiveness, and for each to modify their rules and regulations to achieve uniformity with those identified as being optimally effective;
14. To mutually develop and individually implement a model national program for developing and maintaining a statistical base and research program appropriate both for assessing the magnitude and nature of the pedestrian safety problem, and for evaluating the effectiveness of all activities aimed at reducing pedestrian casualties; and
15. To mutually develop and individually implement procedures for initiating cooperation development and demonstration projects in pedestrian safety, for evaluating the effectiveness of these and other new approaches, and for exchanging the resulting data.

Alcohol and Highway Safety

INTRODUCTION

It has long been recognized in industrialized countries that alcohol is one of the major contributors to traffic crashes which produce death and serious injuries. The tragedy is that innocent people who have not been drinking – passengers, pedestrians, people in other cars – are often the victims.

The significance of driver and pedestrian impairment due to consumption of alcohol as a cause of traffic accidents has been thoroughly documented in many different reports. In Canada, studies indicated that 50 percent of all drivers or pedestrians fatally injured were drinking shortly before the crash. Seventy-eight percent of those drivers had blood alcohol concentrations (BACs) of .10 percent or greater by weight. Compared to the nondrinking driver, a driver with a BAC of .10 percent is eight times more likely to be involved in a fatal crash. At the .15 percent level, the risk of crash involvement increases by a factor of 25 or more.

To bring the problem further into focus, it is quite likely that the crash-involved driver or pedestrian found to have a high BAC is not simply a social drinker gone awry for the instant. To the contrary, in the United States, from one-third to two-thirds of drivers involved in fatal and serious crashes have a record of previous arrests for public drunkenness, for drunk driving, or have been to public agencies as a result of a drinking problem. Various studies suggest that these people who are in need of treatment for their drinking problem constitute less than 10 percent of the driving public; however, they contribute to as many as a third of the traffic deaths. Swedish studies similarly suggest that problem drinking plays a large role in their alcohol-related crashes.

Drinking and driving habits in any nation are not easily changed, and are deeply ingrained over many years. But change is possible. For example, the modified British alcohol safety program initiated under their Road Safety Act of 1967 showed that a major impact can be made on alcohol-connected fatalities in a relatively short period of time. In the first 12 months of this program, a 15 percent reduction in automobile fatalities and an 11 percent reduction in the number of seriously injured drivers were experienced. Although the effect was greatest the first year after implementation of the Act, substantial savings continued into the second and third years.

Most countries have taken steps to dissuade people from driving after having consumed alcoholic beverages. Some programs have been in effect for some time; others are quite new. Legal restrictions and methods of implementation vary widely. For example, the legal limit of alcohol in the blood (BAC) above which the driver is considered to be impaired by alcohol varies from .05 percent to .15 percent by weight. In some countries, two standards are used corresponding to the seriousness of the offense. In addition, the ability to obtain convictions for drunk driving and the penalties resulting from conviction vary greatly from one country to another.

In parallel with more stringent legal penalties, numerous educational and medical countermeasures are used to rehabilitate drivers convicted of alcohol-driving offenses. Public information and education programs are promoted to alert road users to the hazards of drinking and driving, and to prepare the public for stricter drinking-driving laws. While many different types of countermeasure programs are undertaken by nations, few of these programs have been fully evaluated. Regardless of the countermeasure, there is a paucity of data on its effectiveness in reducing the incidence of drinking and driving. It is apparent that all too frequently countermeasures are implemented on speculation and ideology rather than solid evidence of their effectiveness.

With different countermeasures employed by a government, or with different levels of attention devoted to the same activity, the countermeasures in the aggregate produce widely varying results. For example, up to 50 percent of all fatally injured persons in Canada and the United States are found to be impaired by alcohol; the comparable figure appears to be only 10 percent in Sweden, Norway, and other Scandinavian countries. Social customs have as great or even greater effect on drinking and driving as does the deterrent effect of a countermeasure program. Which factor is producing the effect and whether the countermeasure might be similarly effective in other countries is unknown.

The purpose of the CCMS Alcohol and Highway Safety Project was to determine what countermeasures were being implemented, what was known of their effectiveness, and to determine what actions were necessary to enable government road safety program administrators to adapt countermeasures of proven effectiveness to their programs.

METHOD

The Canadian Ministry of Transport, recognizing the important relationship between alcohol and driving, had done a number of studies designed to identify countermeasures to this problem. Therefore, the Ministry was pleased to accept the leadership for the Alcohol and Highway Safety project of the NATO CCMS Pilot Study on Road Safety. The Canadian project consisted of:

1. A personal visit by a Canadian researcher to several member countries to discuss the problem with other leading researchers.
2. Preparation and circulation of a questionnaire on alcohol and driving which included a detailed review of 25 countermeasures. Twenty-eight countries responded to the questionnaire:

Australia
Austria
Belgium
Canada
Czechoslovakia
Denmark
Ethiopia
Federal Republic of Germany
France
Hungary
Iceland
India
Republic of Ireland
Japan
Malaysia
the Netherlands
New Zealand
Norway
Poland
Portugal
Romania
South Africa
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

3. Analysis and collation of the 28 replies to the questionnaire.
4. A series of pilot programs for the purpose of developing alcohol roadside survey techniques.
5. Development of a protocol for roadside surveys with the cooperation of Belgium, Denmark, the Federal Republic of Germany, France, Italy, the Netherlands, the United Kingdom, the United States, and OECD.
6. Four projects to evaluate existing Canadian countermeasures:
   a. The Edmonton Study – October 1973.
   b. The Breathalizer Legislation – An Inferential Evaluation – October 1973.
   c. The Evaluation of the Alberta Impaired Drivers Project (a rehabilitation program) – not yet published.
   d. The Evaluation of a Drinking-Driving Public Education Campaign in Saskatchewan – not yet published.
7. Two reports prepared by the Canadian Government:[1]
   a. Alcohol and Highway Safety Project.
   b. Roadside Surveys of Drinking-Driving Behaviour: A Review of the Literature and a Recommended Methodology.

In addition the United States Government has contributed two reports.[1]

a. International Conference on Alcohol and Traffic Safety.
b. Alcohol Safety Action Projects: Evaluation of Operations 1972, Volume 1, Summary.

DISCUSSION

The survey of countermeasure programs indicated that a number of innovative programs were implemented by the nations participating in the survey, but few of these programs were being evaluated. The few evaluation studies available tend to be government reports which receive very limited distribution. The survey identified an initial need for increased evaluation of ongoing activities and improved dissemination of results.

However, it is difficult to evaluate program impact. This is illustrated in the following table and accompanying explanation related to the situation in the United States.

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[1] See Appendix 5 for availability.

ILLUSTRATIVE EXAMPLE OF ALCOHOL PROGRAM EVALUATION AS APPLIED TO ENFORCEMENT AS VIEWED IN THE UNITED STATES

	Input		Output	
Government Program Evaluation	**Funds**	**Effort**	**Activity**	**Impact**
Analogy to Private Industry Accounting	Investment	Facilities Plant and Labor	Products	Sales
Alcohol Safety Enforcement Campaign	Program Dollars Expended by Police Department on Campaign	Vehicles and Other Equipment Purchased Man-Hours Utilized	DWI Arrests[1] Other Arrests Accidents Investigated	Crashes Before, During and After Campaign Crashes During Patrol Hours vs. at Other Hours
Efficiency Measures of Campaign		Patrol Man-Hours Obtained per Program Dollar	Arrests per Patrol Man-Hour or Arrest per Dollar of Program Cost	Dollar Value Savings Due to Reduction in Crash Over Program Cost
Campaign Targets	Program Budget for Police Department	A Maximum Investment of $10 per Patrol Hour	One DWI Arrest per 8-Hour Shift	Two Dollars in Savings in Societal Costs per Dollar Invested

Government officials in the United States interested in alcohol program analysis and evaluation consider that there are four useful levels of data. The first is the number of dollars invested in the program. This is usually well-documented. A second level of data generally available involves the level of effort produced by the funds: e.g., hours of police manpower purchased, number of additional traffic courts funded, number of additional traffic signals added to the road system, etc. Again, because of the need for financial control, this information is also generally available. These two levels of data involve two aspects of the resources put into a traffic safety effort.

The evaluator of alcohol and road safety programs is interested in relating this input to its impact on road safety. In terms of output there are at least two levels available for evaluation. First, there is the immediate activity resulting from the increase in man-hours or facilities provided by the funds. For example, if funding is provided for enforcement, the increased police man-hours can normally be related directly to an increased number of arrests made, accidents investigated, calls responded to, etc. If, on the

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[1] DWI – Driving while under the influence of alcohol.

other hand, the investment is in driver education, the number of students trained is an immediate activity outcome of the input funding and effort. These activity levels can provide an initial evaluation of the efficiency of a safety investment. However, in most safety programs, the major interest focuses on the impact of a program on traffic casualties.

Normally, it is far easier to relate the input measures to activity level than to traffic casualties. It is easier to count arrests made by the officers funded by the program than to measure the impact of this activity upon highway casualties. As a result, some administrators evaluate their efforts entirely in terms of the activity generated and lose sight of the ultimate goal of the program. On the other hand, the desire of the public and public officials that impact be demonstrated, frequently results in setting unrealistic goals in relation to the potential of a given program, despite the fact that a number of other variables such as food prices or unemployment may be having independent effects on the problem. These additional contributing factors may at any given point in time result in a relatively low impact of even a relatively large, well-organized and well-managed alcohol and road safety effort.

As a result of the difficulty of evaluating program impact as illustrated in the above example and discussion, the need for an improved method of countermeasure program evaluation was identified. A method which could be applied to any nation's efforts yielding more reliable information than dependence upon highway crash statistics was needed. Crashes, being rare events which result from a multiplicity of factors, are a relatively insensitive measure of the impact of an alcohol safety program. More definitive information on the drinking-driving level within a nation can be obtained by measuring directly the concentration of alcohol in the blood of a random sample of drivers using the roadway.

In the course of this project, through the cooperation of scientists from participating nations, a detailed procedure was developed for conducting "Voluntary Roadside Surveys of Breath Alcohol Concentrations." The procedure permits an estimate of the proportion of drivers whose blood contains a significant blood alcohol concentration. The purpose of these surveys is threefold:

1. To determine the base level of alcohol use in a given population and to determine the characteristics of those individuals most involved in the drinking-driving problem.
2. To detect changes in the overall number of impaired drivers and provide an objective evaluation of countermeasures programs by periodic repetition of a standardized survey.
3. To enable the comparison of program effectiveness from one nation to another by use of a consistent system for the collection of these data, so that each participant might take advantage of the results of the other members' countermeasure efforts.

Thus, to assess the extent of the alcohol-impaired driving problem and to provide a data base against which to evaluate future countermeasures, it is highly desirable to perform national voluntary roadside surveys of breath alcohol in all drivers at a selected sample of points in a road network. Further, in order to compare the impaired driving problem and the effectiveness of countermeasures used in several nations, it is essential that similar protocols for roadside screening surveys be used by all countries. Examples of the effectiveness of this technique for evaluating alcohol countermeasure efforts are provided in the detailed Canadian and United States Reports which are part of this CCMS Study.[1]

An integral aspect of the protocols for roadside screening surveys is the instrument used for breath-testing. As a result of recent technological advances, a number of new breath-testing systems are under development and will soon be offered for sale throughout Europe and North America. Apart from their use in roadside surveys, they may present new approaches to the enforcement of drinking and driving laws. To ensure that this equipment performs consistently and facilitates international exchange of data, it is essential to develop and adopt international standards for such equipment. Such standards, by providing a uniform set of requirements, would stimulate further development of such devices by manufacturers.

PRINCIPAL CONCLUSIONS

Drinking and driving is a problem throughout the world, and is tied closely to the drinking habits in a country and the society's general attitude toward drinking. Thus, countermeasures must vary from country to country and be designed with the individual country's legal and social norms in mind. For these reasons, it is unlikely that some "best" set of action programs will be discovered which will be equally effective in all countries. However, it is possible to adopt an integrated, systematic approach to the available countermeasures. This will enable a nation to examine alternatives and adapt some best set of practices to its specific needs. The overriding requirement is to develop and validate methods for making a meaningful evaluation of the results produced by countermeasure programs so that the responsible government officials will have the information needed for effective planning.

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[1] See Appendix 5 for availability.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. That each nation examine the recommended drinking-driving countermeasure opportunities as described in the project report and other publications, and adapt those that will aid in augmenting or intensifying its national programs to dissuade people from drinking before they drive.
2. That each nation designate a single official to be cognizant of their drinking-driving countermeasure program, including as applicable the identification of problem drinkers, legal, enforcement, public health, medical, education, and other programs aimed at changing national perspectives to drinking and driving. This official would facilitate the country's participation in the numerous international cooperative efforts.
3. That each nation establish a national program for roadside surveys of breath alcohol in all drivers at a selected sample of points in a road network.
4. That the protocols used in this national program be those developed by the Road Safety Pilot Study in cooperation with the Organization for Economic Cooperation and Development.
5. That these national roadside surveys be part of a broader program aimed at obtaining numerical descriptions of the extent of the drinking-driving problem. Where possible, the data produced by the roadside surveys on the amount of alcohol in all drivers should be augmented by data on breath or blood alcohol in all drivers and pedestrians involved in fatal crashes.
6. That each nation initiate procedures for systematically and scientifically evaluating the effectiveness of existing and new countermeasures to drinking and driving.
7. That each nation organize or improve its records systems for the collection, storage, retrieval, and analysis of data required to evaluate the effectiveness of drinking-driving countermeasures. The records system should combine and correlate data usually collected by different agencies. Included are accident data, medical history records, public health records with regard to alcoholic rehabilitation programs, and court records.

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

1. That interested nations agree to exchange information on techniques of existing and new drinking-driving countermeasures, and the effectiveness of each.
2. That interested nations agree to adopt protocols developed by the Pilot Study in cooperation with the Organization for Economic Cooperation and Development on the conduct of roadside surveys.
3. That interested nations agree to act in concert in the development of equipment for measuring alcohol in the breath, and to develop and validate in an appropriate international organization a set of international performance standards for such devices for use in law enforcement and other countermeasure activities.
4. That interested nations agree to organize themselves to implement these international cooperative efforts, and that one of these nations volunteer to serve as the coordinating country that will collate, analyze, and disseminate the results of this cooperative exchange.
5. That interested nations agree to organize an international workshop on roadside voluntary surveys and other activities pursuant to initiating this program.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON ALCOHOL AND HIGHWAY SAFETY[1]

Date:__________

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that the presence of excessive amounts of alcohol in the blood of vehicle drivers plays a substantial role in the production of crashes that cause fatal or serious injuries to vehicle occupants and pedestrians;

Considering that most nations are engaged in safety programs to counteract this factor and that despite this activity, little information is available on the effectiveness of these countermeasures;

Recognizing that data on the effectiveness of such countermeasures are critical to the development of effective safety programs;

Recognizing that a substantial amount of information is already available or could be made available by improved documentation of program impact and increased exchange between nations of these data; and

Regarding the Alcohol and Highway Safety Project under the direction of Canada as part of the NATO CCMS Road Safety Pilot Study as having:

- provided a review of the previous studies which have identified this problem
- described the countermeasures now in use
- developed procedures for one effective method for evaluating countermeasure programs by conducting roadside voluntary surveys of drivers to determine blood alcohol levels;

Do Hereby Resolve:

1. To maintain and increase measures against drinking and driving;
2. To maintain and increase measures to reduce crashes in which alcohol plays a role;
3. To maintain or develop an integrated national alcohol safety program directed toward systematic planning of countermeasures effort;
4. To maximize efforts to evaluate the effectiveness of alcohol countermeasure programs;
5. To support these efforts by making every effort to conduct national roadside surveys of drivers to determine their blood alcohol concentrations;
6. To conduct such surveys so as to satisfy the minimum procedures and the reporting format recommended by the Alcohol and Highway Safety Project of the CCMS Road Safety Pilot Study;
7. To furnish data of such surveys to Canada who will collate and disseminate the results;
8. To cooperate with each other and with non-member nations in an appropriate international organization to:
    - develop a model of performance specifications for equipment used in measuring alcohol in breath
    - develop alcohol countermeasures and exchange information on such measures
    - conduct related research and exchange resulting data; and
9. To organize themselves for purposes of implementing or coordinating and reviewing the international cooperative effort called for above and to facilitate the information exchange.

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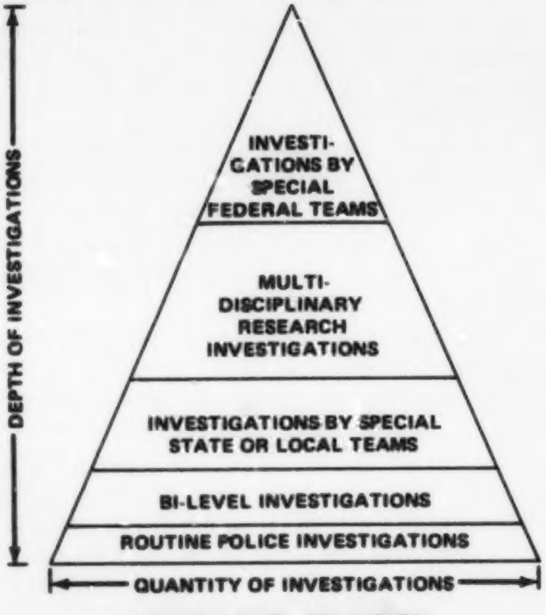
[1] This is essentially the consensus text developed in the meeting of Government specialists on alcohol and highway safety held at NATO Headquarters on October 16-17, 1973.

Accident Investigation

INTRODUCTION

Accident investigations represent the most direct means of obtaining information on vehicle crash causation and the resulting injuries and property damage. The information obtained has a large number of uses, e.g., in criminal prosecution for driver drunkenness or other driving violations, in civil litigation in the settlement of damage suits, and in identification of vehicle defects and highway deficiencies that may have contributed to the accident, as well as in basic research on crash phenomena.

To meet economically the wide variety of data needs in a comprehensive road safety program, several different levels of accident investigations are required. A hierarchial arrangement of five different types in use in the United States is illustrated below.


DEPTH OF INVESTIGATIONS
INVESTIGATIONS BY SPECIAL FEDERAL TEAMS
MULTI-DISCIPLINARY RESEARCH INVESTIGATIONS
INVESTIGATIONS BY SPECIAL STATE OR LOCAL TEAMS
BI-LEVEL INVESTIGATIONS
ROUTINE POLICE INVESTIGATIONS
QUANTITY OF INVESTIGATIONS

MULTI-LEVEL COLLISION INVESTIGATION SYSTEM

Routine Police Investigations

For every crash in which there is personal injury or estimated property damage in excess of $200.00[1], a local law enforcement officer conducts an investigation on the scene, and prepares a report. A minimum, yet nonetheless substantial, number of data items (date and time of the crash, persons injured, identity of driver, driving violations, weather condition, etc.) must be described in considerable detail. Subsequent compilations of these data aggregated for all accidents comprise the basis for all summaries of accident experience.

Bi-level Investigations

In bi-level investigations, additional data items related to specific operational problems or studies are added to the data collected in the routine investigations. The additional data are collected according to a properly planned statistical sampling plan. Once the sampling plan is completed, the bi-level data items no longer are collected. The sampling plan might call for data which can be aggregated or compared, generated from geographically distant locations, or randomly over a period of time. An example of a study that might be undertaken with bi-level data would be to relate skidding accidents to the condition of the pavement involved.

Investigations by Special State or Local Teams

These teams are typically composed of a police accident investigation specialist and a highway engineer. In some instances, a behavioral psychologist may also be available to work with the team. The primary function of these teams is to study in depth certain high accident frequency areas ("black spots") of the state's highway system, determine accident causation, especially catastrophic, multifatality crashes, and may also serve to check on the quality and accuracy of routine police investigations.

Multi-disciplinary Research Investigations

The most thorough accident investigations are those conducted for research purposes by trained researchers. Such investigations might be directed toward "primary safety" factors (for example, discovery of pre-existing drinking habits and other psychological profiles of crash-involved drivers) or "secondary safety" factors relating to injury causation. Secondary safety has primarily been the subject of this multidisciplinary approach involving the so-called medical-engineering team. The team conducts in-depth research studies on vehicle crash and injury causation, starting with detailed on-the-scene procedures and continuing with intensive followup research including:

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[1] This is not a standard criterion, but is a prevalent level of "reported" accidents.

- Clinical observation of serious injuries (including eventually autopsy).
- Engineering analysis of vehicle damage.
- Correlation of vehicle damage with its initial design and the injury patterns of its occupants.

Investigations by Special Federal Teams

These involve teams of trained specialists in various aspects of accident investigation and reconstruction (highway engineers, automotive engineers, mechanics, driving behavior analysts) which are organized on short notice for rapid dispatch to the scenes of "catastrophic accidents." Analyses by these teams of various aspects of different crashes, supplemented by public hearings, provide detailed information on accident causation. The teams might operate out of state or local agencies, or even the federal government. These teams will not be dispatched to all accidents, but only to a selected few. In some jurisdictions, every fatal accident will be investigated in depth, while accidents in which there were no serious injuries would not be examined even if property damage was high.

By far the largest number of investigations (which are also the least expensive on an individual case basis) are the routine investigations; the fewest and most expensive are the research investigations. The CCMS project was limited to research investigations in order to test the feasibility and utility of several nations conducting these costly investigations in some mutually agreed upon manner and then exchanging the resulting information. The potential benefits from such an approach are substantial, assuming that efficient methods could be developed for its implementation. First, with data collected in ostensibly the same manner in several countries, relatively scarce and expensively obtained classes of data from different countries could be combined to produce larger sample sizes. Second, with the data coming from several locations, findings suggested by the results in one area could be compared with those obtained elsewhere. The conclusions would have greater generality, yielding broader composite insights into the phenomena at work in vehicle accident causation.

The concept of multilaterally agreed upon protocols for research accident investigations could have been examined in the context of both "primary safety" (i.e., the vehicle, driver, and highway factors contributing to the causation of accidents) and "secondary safety" (the protection that a vehicle affords – or fails to afford – to its occupants in a crash). Only "secondary safety" was included, largely to keep the effort within reasonable management bounds. It was considered that if in the initial project, international protocols were found to be useful in providing new insights into "secondary safety", the procedures in subsequent efforts could be generalized to consider "primary safety" as well.

Even within the context of "secondary safety", the project goal was not explicitly one of arriving at some near perfect method for conducting this type of accident investigation, although such an outcome would be most welcome and gratifying. Instead, the project sought to test the premise that each of several nations conducting a sample number of accident investigations in the same manner could produce aggregated data of substantial value to government officials and the automotive industry designers in all the countries involved. The process under test included these general elements:

The Vehicle Deformation Index – A quantitative and qualitative system describing the structural and other conditions of a vehicle following a crash.

The Injury Severity Index – A system for standardized medical descriptions of the condition of an injured occupant after a crash.

Field Procedures – A system for dispatching engineers and physicians to the scene for making vehicle measurements, scaling the extent of personal injuries, and recording the resulting information.

It was also decided not to ask governments to undertake the large numbers of investigations needed to meet sample size criteria for establishing statistical reliability on specific issues of the crash protection capabilities of vehicles. Instead, the case study approach was utilized. Each participating country completed approximately 50 full investigations, this number being judged to be adequate for obtaining the working experience necessary to test and assess the efficacy of the process and to determine the problems involved in obtaining vehicle and medical data.

For the test to be valid, it was necessary to develop practicable and relevant protocols and assure that engineers and physicians from all participating countries were properly trained in their application. Thus, much of the effort was directed toward developing protocols, testing them on a limited basis, and revising them to reflect experience gained in their trial use. With this sequence of trial protocol revisions it might appear that development of a model protocol was the principal objective of the project. Protocol revisions were, in fact, only a necessary step in testing the *process* of international accident investigations.

METHOD

The initial meeting of the Accident Investigation Project was convened by the United States as Pilot Country in Brussels, Belgium, June 1970. The Netherlands agreed to lead the project, and directed activities thereafter. In addition to the United States and the Netherlands, other nations represented at the meeting were: Belgium, Canada, France, the Federal Republic of Germany, Italy and the United Kingdom, with observers from Japan and Sweden.

Apart from an exchange of viewpoints on various substantive aspects of research accident investigations, the primary objective of the first meeting was to arrive at an overall plan for the project. The resulting consensus was that the project generally would develop in three phases:

Phase 1: Development of Report Form Including Vehicle Damage and Injury Rating Scales.

It was agreed that each participating nation would organize its own medical-engineering team which would examine a proposed trial protocol and test it in several actual investigations. The teams would then convene in one or more workshops to exchange information on their field experience with the use of the trial protocol and modify it as a result of this experience.

Phase 2: Case Studies Using the Concensus Protocol.

Once the consensus protocol was agreed upon, each participating nation would conduct at least 50 accident investigations using the protocol.

Phase 3: Analysis of the Project Effectiveness.

The data from the case studies would be aggregated and analyzed as a basis for assessing the validity of the basic premise of the project; namely, the feasibility and utility in several nations conducting research accident investigations in the same manner.

A technical workshop was held October 1970 in Wolfsburg, Germany, hosted by the Federal Republic of Germany and Volkswagenwerk AG. The principal objective of the workshop, which was attended by medical and engineering experts from all participating countries who were in general the team leaders, was to discuss the version of the report form to be tested on a preliminary basis at the outset of the field work. Subsequently, training sessions in the use of the form were held in the United States with 25 team members from Canada and European countries attending.

Based upon suggestions received at the training sessions, and limited additional field testing, the form was modified and distributed for more extensive field tests by all of the multidisciplinary teams. The field tests, which involved application of the modified trial protocols to actual accidents, continued through the spring of 1971.

In July 1971, the Italian Government and Fiat S.p.A. hosted the second workshop in Turin, Italy. Experts and team leaders reported on their respective experiences in applying the protocols during the period that elapsed since the first workshop. Numerous changes in the protocols were proposed and, for the most part, incorporated in revised protocols which were used by each participating nation to complete its case load.

The protocols finally agreed upon were derived from the recommendations of all the participating teams from the several countries and were based upon the experience gained in the actual application of the earlier versions. It is believed that this effort represented the first attempt of its type to design a system for scaling vehicle damage and injury severity that could be universally applied to all crash situations in all countries.

The final working protocol was printed and distributed to all participants. The accident investigations program using the final (and by then thoroughly tested) procedures was started. A total of 520 individual case Study Reports were received by the Project Chairman from 33 teams representing nine countries. Aggregation, encoding, and analysis of the case study data was initiated.

Upon completion of the field accident investigations, and while the case study reports were being analyzed, a questionnaire was prepared and distributed to all participants in the project, including members of the accident investigation teams, government officials, participating companies, researchers and others. The questionnaire, in the form of an a posteriori critique of the protocol and its use in actual investigation of accidents, requested responses to 15 items of information.

A final workshop and meeting was held in Brussels, Belgium, in June 1973 to discuss investigative methodology related to assessing vehicle deformation, determination of impact speeds, scaling of injuries, and other possible use of a shorter report form formulated on the basis of the responses received to the questionnaire. The discussion focused specifically on the overall results of the Project, its conclusions and recommendations.

DISCUSSION

The basic reason for conducting samples of in-depth, research-type accident investigations is that only by such investigations can the data that are urgently needed for many aspects of a road safety program be obtained. For example, information on the collapse characteristics of a vehicle structure in relation to the injuries suffered by its occupants in a crash is of vital importance to establishing cost-effective regulatory standards for the crashworthiness of a vehicle. Routine investigations of crashes by police are not intended to provide such information; nor are police officers trained in the necessary measurement techniques.

Moreover, regulatory standards on the "secondary safety" performance of a vehicle are defined in the context of results obtained in crashing instrumented vehicles into fixed barriers at carefully controlled speeds and angles of impact. Questions are often raised as to the relevance of this kind of standard to automobile performance in actual crashes where people are killed or injured seriously. Clearly, the needed correlations can be obtained only by making precise after-the-fact measurements on vehicle damage and injuries suffered by occupants in a crash, and comparing the results with those projected from barrier impacts.

The in-depth accident investigations needed to produce this kind of information are comparatively expensive, and must be performed for a wide variety of crashes with respect to all makes and models of vehicles. The advantages of having a number of widely dispersed teams conducting comparable accident investigations are obvious. The resulting data can be aggregated to provide a broader data base, and each nation's costs in this respect can be minimized. The questions at hand are whether or not it is feasible, practicable, and useful to have a number of participating nations conduct such investigations using commonly agreed upon procedures and reporting protocols.

This project was organized specifically to study these questions, and could have been structured in the conventional form of constructing questionnaires and organizing workshops of experts to analyze responses and produce consensus findings. Instead, the much more difficult case study approach was used, and the participating countries conducted actual accident investigations and exchanged viewpoints on their separate experiences in using the same methodology.

At the outset, many participants expressed major reservations about the usefulness of the effort. As various operational problems emerged and were "debugged," enthusiasm mounted steadily. At the conclusion of the field work and exchange of experience, the general consensus was one of enthusiastic support for such international cooperative efforts. In illustration, a troublesome issue from the start was how the information contained in each case study report could be combined with the data from other cases, and the aggregated information distributed to all participants with appropriate safeguards against disclosure of proprietary materials. The problem was successfully solved by developing a computer program that meets these needs and testing its workability on the 520 case study reports submitted to the Project Leader by the participants.

It was also suggested that those participating countries and organizations having their own data processing and analysis capabilities could perform these functions themselves with the exchange of results and raw data on a reciprocal agreement basis. Those countries and organizations which do not have traffic accident data-handling capabilities could contribute their data to a common pool and have analysis functions performed by a contractor agency under the supervision of the coordinating panel. The exchange of information believed to be proprietary in nature would be subject to the desires of those organizations whose proprietary information is affected.

Although the objective of the project was to test the feasibility of the multilateral case study approach and not to promote a particular report form, it was recognized that if the effort proved to be successful the form and associated protocols might well be considered for adoption. As it developed, the group, after using the agreed upon form, judged that a shorter version would be more suitable for any subsequent program. This shorter form is accordingly presented in the Project Report and is viewed as the nucleus around which a comprehensive international program of accident investigation might be developed. Such a program could readily encompass a broader range of "secondary safety" problems, such as the aggressivity to pedestrians or of "primary safety" problems, such as inadequate skid resistance of pavements, inadequate lighting and improper driver behavior.

Another valuable lesson learned during the course of the project was the importance of having this kind of multilateral effort under the direction of a panel comprised of a government official from each participating nation. Such a panel provides for coordination of the various nations' contributions to the effort. It also provides for general agreements regarding investigative approaches and methodologies (including reporting formats and uniform definitions of highway safety terminology). Also it sets priorities for specific problems to be studied in research-type accident investigations. Based upon the experience gained in the project, the characteristics of such a panel directing a broader international accident investigation effort appear to include:

- Representation for all participating countries (technically competent government representatives empowered to make policy decisions with sufficient tenure to allow for continuity with respect to projected countermeasures development);
- Leadership by a rotating chairman;
- Flexibility; and
- Minimal size and complexity so as not to inhibit effective decision-making.

GENERAL CONCLUSION

The Accident Investigation Project is a successful prototype for an expanded international system for conducting in-depth research-type accident investigations by a number of participating nations using mutually agreed upon protocols.

Although tested in the context of the relationship of vehicle damage to injury causation, this international system could be profitably and effectively adapted not only to other "secondary safety" matters of priority importance (such as vehicle front-end aggressivity to pedestrians), but also to "primary safety" matters relating to driver behavior and condition of the highway.

To be effective, the expanded international effort should be under the general direction of a group comprised of government representatives, each with substantial decision-making authority to commit national resources toward the accomplishment of agreed upon international goals.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. That each nation either establish or identify an existing agency or organization to oversee the implementation and operation of an accident investigation effort at the national and local levels in cooperation with an international accident investigation system.
2. That each nation, in cooperation with its automotive industry and research community, participate to the fullest extent practicable, in international accident investigation programs that are initiated as followup to the CCMS effort.
3. That each nation incorporate uniform definitions and other accident investigation protocols into its national, state, and local accident investigation programs at such time as they are developed by duly constituted international groups.

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

1. That interested nations agree to organize a group, in which they would be represented by policy-level government officials, to guide the development, testing, and implementation of international protocols for conducting both routine and research-type accident investigations.
2. That interested nations agree to develop in concert an international accident investigation system whereby all nations, their automotive industries, and research communities can initiate cooperative efforts that will permit both aggregation and comparison of the data that each collects.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON ACCIDENT INVESTIGATION

Date:

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that several types of routine and research accident investigation activities are basic to the success of all road safety programs;

Recognizing that the research type investigations in particular are complex and costly and hence can only be conducted on a sampling basis by any one nation;

Recognizing that to generate traffic collision data which are uniform and compatible and which can be combined on an international basis to provide larger statistical samples, it is feasible and highly useful for nations to cooperate with each other in an international accident investigation system and for participating nations to employ a common basic reporting format and compatible investigative procedures;

Recognizing that to establish an effective international accident investigation system, it is necessary that its operation be under the direction of an international organization which is representative of all participants and is highly responsive and adaptable to the rapid achievement of national and international highway safety objectives;

Recognizing that for a nation to participate in such a system, it is most advantageous for each to have an operational organization identified which can solicit the necessary cooperation and agreements at the local level and mobilize the required national resources; and

Regarding the accident investigation project under the direction of the Netherlands as part of the NATO CCMS Road Safety Pilot Study as having successfully demonstrated that data from multiple disciplinary research accident investigations can be validly combined and analyzed using a standard computerized reporting form with a common machine language and that analysis of the data can then be used among participating countries;

Do Hereby Resolve:

1. To establish or identify an existing agency or organization to oversee the implementation and operation of an accident investigation effort at the national and local levels in cooperation with an international accident investigation system;
2. To participate to the fullest extent practicable, in cooperation with their automotive industries and research communities, in international accident investigation programs that are initiated as followup to the CCMS effort;
3. To incorporate uniform definitions and other accident investigation protocols into their national, state, and local accident investigation programs at such time as they are developed by duly constituted international groups;
4. To organize a group, in which they would be represented by policy-level government officials, to guide the development, testing, and implementation of international protocols for conducting both routine and research-type accident investigation; and
5. To mutually develop an international accident investigation system whereby all nations, their automotive industries, and research communities can initiate cooperative efforts that will permit both aggregation and comparison of the data each collects.

Emergency Medical Services

INTRODUCTION

In NATO, as well as non-NATO countries, significant activity is directed toward reducing the number of vehicular crashes and the resultant injuries and deaths. To accomplish this goal in part, programs have been developed to improve driver education and public awareness of medical difficulties resulting from highway accidents. There is also considerable effort to increase protection of the driver and other vehicle occupants through the use of seat belts and better vehicle structures.

Notwithstanding these efforts, the number of accidents and the injuries and deaths resulting from these accidents continues to rise. Medical experts believe that significant reductions in deaths and a considerable lessening of the consequences of injuries could be accomplished through improved Emergency Medical Services (EMS). Many victims of traffic accidents die on the scene or shortly thereafter, or suffer severe and possibly permanent disabilities, because they did not receive adequate emergency medical care in a prompt and efficient manner. These traffic accident victims die or are maimed despite the fact that within the medical community of almost all nations, the state-of-the-art in the delivery of emergency medical care in hospitals and medical centers is well developed. How then can this expertise be made available, and the knowledge and technical equipment be more fully applied to aid victims at road crash sites and thereafter until they can obtain definitive medical care in an appropriate medical facility?

METHOD

As the first step toward finding an answer to the above questions, the Emergency Medical Services Project led by Italy conducted a survey to ascertain the scope and nature of emergency medical activities existing in different countries. The project staff developed a basic EMS questionnaire requesting participating countries to provide data and information concerning demography and organization of EMS, training of personnel, ambulance services, emergency detection and reporting of incidents, central communications and connections with emergency medical facilities, and general evaluations of the effectiveness of the EMS system. Questionnaires completed by Canada, Denmark, the Federal Republic of Germany, France, Italy, the Netherlands, and the United States are analyzed in the Project Report.

In February 1972, experts working on the Project met in Brussels, and, after reviewing the responses to the first questionnaire, formulated a small supplementary investigation comprising 19 items of special EMS interest. Results of this effort suggested that a vastly expanded methodology could be developed for collecting EMS information, assessing program activity and evaluating entire EMS systems. Subsequently, such an evaluation methodology was developed and tested on a limited basis at several locations in Europe and the United States.

Also, in early 1972, with the startup of the CCMS Advanced Health Care Pilot Study, a second Emergency Medical Services Project was activated under this Pilot Study. While the EMS work under the road safety program was mainly concerned with response to aid traffic victims, the new EMS Project dealt with response to all medical crises such as heart attacks, burns and other industrial and home accidents. Very close liaison was maintained between the two projects to prevent duplication of effort until, with the completion of the Road Safety Pilot Study, all EMS activity would be phased into the more general EMS effort under the Advanced Health Care Pilot Study.

DISCUSSION

The system for delivery of emergency medical care in a community is closely linked to the system for providing general medical care. Both systems utilize personnel with medical training and equipment and techniques for treating patients. However, the emergency medical care system must respond rapidly as well as efficiently as possible, and it must be organized to strike the right balance between the two antithetical needs of "quickness" and "high quality" of services rendered. The EMS system operates in situations in which there is not time or facilities to provide the quality of treatment of general medical care systems.

Stated otherwise, the EMS system has to properly meet a sequence of requirements well before the injured victim will receive the definitive treatment that the system of general medical care can provide. If the EMS system does not function properly, the injured person might not live to receive definitive treatment. Starting with prompt notification that an accident has occurred and injured people are in urgent need of medical attention, a properly functioning EMS system must:

1. Dispatch an ambulance with onboard medical capability in a manner that will ensure its reaching the scene of the accident in the shortest possible time.
2. Provide appropriate treatment to the injured at the scene of the accident.
3. Stabilize the condition of the patient enroute to the hospital or other needed treatment facility.
4. Deliver the patient to the hospital that has the physician and equipment needed to treat the injuries.

In most developed countries of the world, the systems for providing general medical care are greatly advanced; but, surprisingly, in these same countries, emergency medical services are often of unacceptably low quality under urgent conditions. Emergency medical communications linking hospitals with police and fire departments in general are grossly inadequate. Little attention is given to the training of technicians both in ambulance service and in hospital emergency departments. Proper emergency equipment is lacking in many locations, and where such equipment is available, technicians often do not know how to use it effectively. Also, there is substantial evidence that even the physicians on duty in the emergency departments are not properly trained in emergency medicine.

It is apparent that EMS must constitute a single chain of actions or events, from the moment a need for it arises and is perceived to the moment the need is satisfied with the delivery of the patient to definitive medical treatment. Its several individual components or subsystems are closely interrelated and mutually dependent. Strengthening a single EMS element, without considering possible collateral effects, could be completely useless if not detrimental. Evaluations must be made from the viewpoint of the total system, taking into account the performance of the subsystems and their relationship to total system performance.

The evaluation methodology developed by the EMS project in the CCMS Road Safety Pilot Study presents a coherent approach. With it the performance and benefits of the EMS systems in use can be assessed, missing or weak links in the overall EMS chain identified, costs for alternative improvements estimated and priorities selected for implementing improvements. The methodology was tested in a preliminary way in several locations. Based upon results, it appears to have substantial promise as a useful tool in planning and implementing EMS improvements at national, regional, or local levels. As this methodology in its present form (or variations) is applied in more locations, modifications and refinements will undoubtedly become apparent to the users and new information should be communicated to the others.

The evaluation methodology has been developed in the context of EMS systems to aid traffic victims. However, it could focus on the EMS response to other medical crises such as heart attacks, other acute illnesses, and trauma produced in industrial and home accidents. The EMS system of a community must respond to all medical crises. Moreover, the complete EMS chain extends well beyond the threshold of the emergency department of a hospital, to the training of the specialists who staff these departments and the departments that provide subsequent definitive treatments. Emergency medicine is now coming to be recognized as an important field in its own right.

For these reasons, it is appropriate that the EMS programs started under the Road Safety Pilot Study, including the evaluation methodology, be incorporated into the Advanced Health Care Pilot Study which is addressing the more general aspects of EMS systems in addition to other fields of health care. The evaluation methodology should be modified or expanded to reflect the total EMS problem, but, until this is accomplished, it can be effectively used in its present form for road safety purposes.

PRINCIPAL CONCLUSIONS

In the complex societies of the participating nations, the applications of EMS techniques and procedures now in existence on a systematic basis can play a very important role in lowering the number of deaths, serious injuries, and suffering resulting from highway crashes. But the work of the EMS project in the Road Safety Pilot Study suggests that EMS systems in general use do not make effective use of existing techniques (including effective use of medical and paramedical personnel).

The need to upgrade EMS systems to aid traffic victims is clear. The evaluation methodology (even in its present preliminary form) provides a useful tool as a starting point for a nation to identify the most cost-effective ways of increasing the effectiveness of its traffic accident EMS system. This evaluation methodology should be part of more general EMS systems for dealing with all medical crises. The more general EMS systems should also be upgraded as is now being considered by the CCMS Advanced Health Care Pilot Study.

RECOMMENDATIONS FOR NATIONAL ACTION PROGRAMS

1. That each nation develop and implement programs, on an appropriate sampling basis, to obtain data for assessing the extent of the problem of providing adequate emergency medical response systems to aid vehicle crash victims in both rural and urban areas.
2. That each nation intensify its EMS program, adapting to its needs the findings of the EMS Project of the CCMS Road Safety Pilot Study, so as to reduce the number of deaths that occur from the time of the vehicle crash to the delivery of injured victims to a hospital.
3. That each nation use the EMS assessment model, adapting it as necessary to meet local needs, and make the findings resulting from its use available to other nations.
4. That each nation assess the need for expanded training programs of both professionals and paraprofessionals in the emergency medical response field, and implement such training programs as are found to be required.
5. That each nation design and implement a continuing program to assess the benefits and costs of existing and new EMS practices. Particular attention should be paid to the use of helicopters, advanced command and control (communications) networks, centrally dispatched ambulances, closed-circuit TV and other communications (such as telemetry of vital function data from the pickup point to computers in regional or national medical centers).
6. That each nation establish national standards of performance for EMS systems and initiate necessary statutory or administrative actions to ensure the implementation of such standards at federal, state and local levels.
7. That each nation establish public information and education programs on the relevance of proper EMS systems to saving the lives of people injured in crashes.

RECOMMENDATIONS FOR INTERNATIONAL COOPERATION

The following recommendations for international cooperation in EMS systems, while developed in the context of the Road Safety Pilot Study, are relevant to general EMS systems for all medical crises. They are accordingly recommended for incorporation as a part of the continuing CCMS Advanced Health Care Pilot Study for implementation and other followup:

1. That interested nations agree to mutual and systematic exchange of experiences in the application of EMS procedures to aid vehicle crash victims.
2. That interested nations cooperate in testing the EMS evaluation methodology developed by the Road Safety Pilot Study, modify the methodology as indicated by such operational tests, and adopt common standards for such evaluations.
3. That interested nations establish an international exchange program of EMS personnel in order to gain better insight into what each is doing in this field.
4. That interested nations cooperate in developing EMS standardization or harmonization programs, such as:

- A universal EMS language.
- Standards for emergency telephone systems or other roadside provisions for emergency communications.
- Standards for basic and advanced levels of training for paramedical personnel.
- Standards for training physicians in emergency medicine.
- Standards for ambulance design.
- Standards for performance and configuration of medical equipment for ambulances, mobile intensive care units, and emergency departments in hospitals.
- Agreed radio frequencies for transmission of voice and telemetric information within the EMS communications system.

5. That interested nations cooperate in studying such priority EMS topics as:

- Early detection of accidents and sudden illnesses, so as to bring EMS systems into action as quickly as possible.
- Comparison of the cost effectiveness of EMS systems which routinely dispatch a physician to the crash site (e.g., as in France) as opposed to EMS systems which routinely dispatch only

paramedical personnel to assess the degree of injury and need for a physician (e.g., as in the United States).

- Cost benefits of operational control dispatch.
- Cost benefits of the use of helicopters on a national basis.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON EMERGENCY MEDICAL SERVICES

Date:

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that the survival and subsequent recovery of seriously injured vehicle occupants or pedestrians depend largely on how much time elapses after the crash before proper emergency care and definitive medical treatment are administered;

Considering that carefully coordinated and smoothly functioning communications, transportation, and medical treatment arrangements can save the lives of many traffic victims who otherwise would die;

Considering that apart from significantly reducing traffic deaths, the same emergency response systems can save many lives in other medical and surgical crises, such as heart attacks, burns, ingestion of poisons, and infant illnesses;

Considering that systematic national assessments of existing Emergency Medical Systems (EMS) and international cooperation in evaluating these assessments can lead to identification of program elements which can be expanded in a cost-effective manner; and

Regarding the Emergency Medical Services project under the direction of Italy as part of the NATO CCMS Road Safety Pilot Study as having identified the major elements of effective EMS programs, and as having developed and tested an EMS assessment model;

Do Hereby Resolve

- To develop and implement programs, on an appropriate sampling basis, to obtain data for assessing the extent of the problem of providing adequate emergency medical response systems to aid vehicle crash victims in both rural and urban areas;
- To intensify each of their EMS programs, adapting to their needs the findings of the EMS Project of the CCMS Road Safety Pilot Study, so as to reduce the number of deaths that occur from the time of the vehicle crash to the delivery of injured victims to a hospital;
- To apply the EMS assessment model, adapting it as necessary to meet local needs, making the findings available to the community of nations;
- To assess the need for expanded training programs of both professionals and paraprofessionals in the emergency medical response field, and to implement such training programs as are found to be required;
- To design and implement a continuing program to assess the benefits and costs of existing and new EMS practices, with particular attention to the use of helicopters, advanced command and control (communications) networks, centrally dispatched ambulances, closed-circuit TV, and other communications (such as telemetry of vital function data from the pickup point to computers in regional or national medical centers);
- To establish national standards of performance for EMS systems and initiate the necessary statutory or administrative actions to ensure implementation at federal, state and local levels; and
- To establish public information and education programs on the relevance of proper EMS systems to saving the lives of people injured in crashes.

Experimental Safety Vehicles

INTRODUCTION

Automobile manufacturers each year produce increasingly safer vehicles. In the United States, prior to enactment of the safety legislation in 1966, such advances were entirely voluntary on the part of manufacturers. Thereafter, many improvements were still made on a voluntary basis, but most safety improvements could be traced directly to Government-issued safety standards applicable to all vehicles sold in the United States, irrespective of place of manufacture. However, all safety improvements, whether voluntary or mandated, generally were design "add-ons." As late as 1971, no attempt was made to produce a complete vehicle with safety as the dominant design goal.

It became increasingly clear as regulations required vehicles to have more and more safety features that the piecemeal approach was not suitable from the standpoint of producing good design solutions at a price that most people could afford to pay. For without mutually consistent performance requirements or, worse, redundant devices or other requirements not producing much in the way of safety benefits, the price of the car might well be higher than necessary.

The need was for a total systems approach which would both take into account all requirements and desirable goals sought for the vehicle, and assure that all these requirements could be met without violating some overall constraint, such as cost or weight. The systems approach is not new. For example, military and space research and development have long employed the systems approach in designing complex military and space hardware to meet many criteria, not all of which are mutually compatible. However, this approach was not in general use in the automotive safety field, at least with respect to government regulation.

Under the 1966 safety legislation, the United States undertook a program of automotive research and development on a total systems basis. This experimental safety vehicle or ESV program had four objectives:

- To demonstrate the technical feasibility of significant advances in automotive safety performance and crash survival and the environmental effects of such advances through design, development, and testing of experimental motor vehicles.
- To stimulate public awareness of the injury reduction potential and associated economic advantages of advanced automotive safety design.
- To encourage the automotive industry, both foreign and domestic, to increase its level of effort in motor vehicle safety research and to accelerate the integration of advanced safety systems into production vehicles.
- To apply the engineering data from ESV evaluation and testing to development of new motor vehicle safety standards.

However, to begin the process of translating advanced safety concepts into production vehicles, it was apparent that all the major automobile manufacturers should become involved. Automobiles are marketed internationally by only a few highly industrialized nations, but are used throughout the world.

Thus, the ESV Project under the CCMS Road Safety Pilot Study had as its purpose the encouragement of governments and industries to undertake costly experimental safety vehicle research and development programs, and exchange the results of these programs with each other. This exchange program was to provide information which would assist governments in developing new motor vehicle safety standards or other techniques for encouraging the development and marketing of substantially safer production vehicles.

METHOD

As the Pilot Study began, the United States was already heavily engaged in its national ESV program involving the 4,000-pound family sedan which predominates on U. S. roads. This U. S. program accordingly became the foundation for the broader international ESV program under CCMS.

The essence of the CCMS ESV Project was that foreign governments sponsor the development of ESVs in the compact and subcompact vehicle classes to complement U. S. work on the larger 4,000-

pound family sedan. All participants agreed to keep each other informed by exchange visits of engineering teams, open discussions at technical meetings, cooperative testing of vehicles, and publication of findings. With these broad purposes in mind, bilateral Memoranda of Understanding were signed between the United States and the Federal Republic of Germany, France, Italy, Japan, Sweden, and the United Kingdom.

Even before these agreements were formally signed, important cooperative exchanges began to take place. With the U. S. ESV program moving rapidly ahead, it was essential to fix upon the technical details of the test and performance evaluating procedures that could be applied to the 4,000-pound ESVs. It was thought that the same procedures should be used to test the compact and subcompact ESVs being developed as a part of the CCMS Project. Many useful suggestions from various countries were incorporated in developing a test and performance evaluation system which could be used across the board. More work is required in this respect.

Under the CCMS ESV Project, governments in conjunction with their automotive industries developed comprehensive sets of safety specifications for complete vehicles or as in the case of France and the United Kingdom, worked initially on safety subsystems related to accident data. Then manufacturers undertook or are undertaking the design and construction of prototype vehicles to meet or exceed the levels of safety performance called for in the specifications, either under an award from the government or on a voluntary basis. Details of the design were left to the manufacturers. Some prototypes are still under construction. As construction is completed, the manufacturer delivers the prototype to the government for tests to see whether it meets the defined specifications.

Thus, all ESV work starts with the establishment of the performance specifications which the experimental vehicle must meet. For the purpose of the CCMS Project, the U.S. specifications were the starting point. These specifications emphasized optimum trade-offs between occupant injury reduction, accident avoidance, post-crash factors, and pedestrian safety. The prototype ESV was to demonstrate the upper limits of safety performance of passenger cars using existing state-of-the-art concepts and materials. Highest priority was on "secondary safety," that is the reduction of occupant injuries in crashes. The CCMS ESV Project specifications called for crash survivability with respect to the following equivalent barrier impacts:

- Frontal impacts of 50 mph into a rigid barrier
- Rear impacts at 50 mph
- Side impacts at 30 mph
- Roll-overs at 70 mph.

It is useful to note that a frontal impact of 50 mph into a rigid barrier is the approximate equivalent of a normal head-on collision with another vehicle of similar mass involving relative closing speeds of nearly 90 mph. Also included in the specifications were the primary safety requirements of improved braking, handling and stability, lighting, and visibility.

These and other specifications were developed for a 4,000-pound vehicle, and whether they were appropriate for compact and subcompact ESVs was not known. In fact, a major purpose of the CCMS ESV Project was to identify the maximum levels of safety performance that could be achieved in smaller size vehicles which were both technologically feasible and economically acceptable.

The work under the separate Memoranda of Understanding proceeded. Most of the participating nations have been or are in the process of testing ESVs; others are completing important subsystem developments and other research studies and are now applying the results to production vehicles. Numerous exchange visits of engineering teams were completed, but the most important transfer of technology and exchange of research findings took place in a series of four major international conferences: Paris in January 1971; Stuttgart in October 1971; Washington in May 1972; and Kyoto in March 1973. Complete proceedings of the conferences, including the technical papers presented by the attending government and industry representatives, were published.[1] A fifth conference is planned for London in June 1974.

The last part of an ESV program cycle involves the testing of completed ESV prototype vehicles to determine the extent to which they meet the initially established performance specifications. Extensive tests of the U. S. ESVs, which were the first ESVs to be built, were completed. Observers from all participants in the CCMS ESV Project were present. A prototype Italian ESV built by Fiat was delivered to the United States and tests on it were completed in 1973. In February 1974 eight Toyota and a Nissan ESV were provided to the United States for testing by a joint Japanese-U. S. engineering team. Negotiations with other countries with respect to ESV exchange testing are now in progress.

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[1] See Appendix 5 for availability.

The second cycle of ESV activity is now getting started in the United States, drawing heavily upon the findings thus far obtained. Specifically, the United States initiated an Advanced State-of-the-Art Research Safety Vehicle (RSV) Project that takes special account of the projected transportation challenges of the 1980's. Safety is still the dominant theme, but the project involves a broader systems approach, addressing such questions as minimizing fuel consumption, urban congestion and pollution, and maximizing resource conservation and safety. The initial proposed specifications for this RSV Project were distributed to all participants in the CCMS ESV Project prior to the Kyoto Conference, and again in June 1973, along with requests for bids to participate in the broad new U.S. program. Contracts for Phase 1 of this program, definition and preliminary design, were signed in January 1974 with Ford, Volkswagenwerk, Calspan, AMF and Minicars.

DISCUSSION

Thirteen different experimental safety vehicles already have been built or are under construction, under the various Memoranda of Understanding around which the CCMS ESV program has been developed:

	Weight	Wheel Base
Germany		
Mercedes	4,620 pounds	112.20 inches
Volkswagen	3,200 pounds	110.0 inches
Japan		
Nissan	2,750 pounds	100.4 inches
Toyota	2,530 pounds	90.55 inches,
Honda	1,700 pounds	92.5 inches
Italy		
Fiat	1,750 pounds	72.44 inches
Fiat	2,570 pounds	96.4 inches
Fiat	2,840 pounds	95.3 inches
Sweden		
Volvo	3,180 pounds	106.3 inches
United States		
GM	5,080 pounds	124 inches
AMF	6,005 pounds	122 inches
Fairchild	5,440 pounds	121.5 inches
Ford	5,100 pounds	124 inches

(The United Kingdom and France, with their automotive industries, are completing safety subsystems development and will be initiating construction of ESVs in the near future.)

In addition, major subsystems development and testing are expected to produce results to be incorporated into the design and construction of additional ESVs. The United Kingdom has developed subsystems for both "primary and secondary safety" to allow assessment of discrete performance levels and to facilitate cost benefit analysis. Particular attention has been paid by the United Kingdom to pedestrian protection and vehicle compatibility. British Leyland is now developing three complete cars using the results.

It is estimated that governments and industry have thus far invested over $150 million in ESV research and development and the correlated subsystems research. This is an unprecedented expenditure in terms of international cooperative efforts in the field. One may ask what this expenditure is producing by way of results.

The various ESV programs initiated as a part of the CCMS Project are at different stages of development; many of the programs cannot be fully evaluated as yet. Nevertheless, some observations can be made from the United States' experience gained thus far. For all practical purposes, each of four U.S. contractors was able to design vehicles that met the predefined specifications with respect to separate "primary and secondary safety" performance requirements. *However, none of the vehicles was able to meet the overall system specification of 4,000-pound curb weight.* Stated otherwise, the fact that all subsystems performance requirements were met did not in the case of these four vehicles guarantee that the overall system requirement with respect to weight would also be met. This result most graphically illustrates the complete "systems approach" at work. This approach has been the keystone of the CCMS ESV Project. In contrast, more conventional automotive safety research deals only with the safety performance of components and sybsystems as separate entities and not in relation to each other.

From the start of the CCMS effort, an important consideration involved the question of the engineering data from ESV evaluation and testing linked to performance requirements for production vehicles. This is part of the broader issue of how all automotive safety research, including ESV research, is utilized to bring about the construction and marketing of safer production cars.

Such research supports development of safety performance standards for production vehicles in two ways:

1. It provides hard and scientifically sound data and test results that relate to a specific regulatory proposal. Such data can be expected to establish (or refute) the technical and economic feasibility of such a proposal. Generally, these research data can be provided within a short time interval, possibly a year or less. The pace of rulemaking substantially depends upon how quickly such needed supporting data can be provided, for without supportive technical information regulations should not be issued.
2. It provides a broad base of data with respect to the optimal total vehicle from the safety point of view. Tradeoffs will be required between competing automotive subsystems, and the total system will have to fit within certain overall constraints, such as those involving maximum weight and cost. The ESV effort is designed to provide this kind of research data and results. The effort does not relate to specific rulemaking proposals, but rather is directed toward vehicle safety problems about which not enough is yet known to contemplate immediate regulatory action. For example, maximum crash protection for a vehicle's occupants, minimum aggressiveness to the occupants of the cars and pedestrians it strikes, and minimum susceptibility to property damage are all important attributes of vehicle design. It is doubtful that maximum performance with respect to one of these attributes can be achieved except at the expense of the others.

Highly complex safety performance problems such as those outlined in the second category above can be systematically studied probably only through the ESV approach. As systems level ESV solutions are developed, more specific subsystem research can be carried out to support additional rulemaking. Thus the ESV programs may be viewed as complementary, to the shorter scope subsystem research.

In summary, the ESV work in the CCMS Project demonstrated the technical feasibility of major advances in automotive safety performance through the development and testing of a number of ESV prototypes. Subsystem performance specifications can be met for various "primary and secondary safety" requirements on an individual basis. Although much remains to be learned with respect to better subsystem design, such design does not appear to be the major problem. The truly difficult problem is how to meet different sybsystem performance requirements within the boundaries of overall system requirements. This, of course, is *the* "raison d'etre" for the ESV approach.

PRINCIPAL CONCLUSIONS

The CCMS ESV Project successfully stimulated an unprecedented investment in cooperative research in automotive safety. An important new body of knowledge has resulted.

In addition, this Project shows that with high-level government support, open and candid exchanges of technical information can be achieved in the highly competitive automotive marketplace of the world, with a concomitant broadening of participants' perspectives.

Many important aspects of automotive safety have been identified that can be treated effectively with ESV methodology and supportive research. Continued international ESV research and development, using the modalities pioneered in CCMS, can be expected to make further important contributions to automotive safety.

RECOMMENDATION FOR NATIONAL ACTION PROGRAM

That each nation participating in the ESV Project continue development and testing of experimental safety vehicles and improved safety subsystems, and exchange the resulting technical information under the existing Memoranda of Understanding and associated Technical Annexes.

RECOMMENDATIONS FOR INTERNATIONAL ACTION

1. That interested nations organize a group, in which each would be represented by policy-level government officials, to coordinate international ESV developments, testing and related research, and to plan and schedule such international conferences and other forms of information exchange as may be indicated.

2. That interested nations cooperate in conducting research in those areas identified by the ESV Project as requiring these additional efforts:

- Reducing additional weight resulting frpm ESV design.
- Reducing aggressivity in collisions between vehicles or between them and pedestrians.
- Improving "primary safety" (steering, braking, suspension).
- Providing for human tolerance to impact forces.
- Improving anthropomorphic dummies.
- Making cost-benefit analyses based on better accident data.
- Improving crashworthy structural design.
- Making more efficient restraint systems.
- Standardizing test procedures.
- Developing modalities for expediting the incorporation of ESV results into production vehicles.

3. That interested nations meet at approximately yearly intervals to report on the status of ESV developments and present and discuss testing and other results.

Based on the above, the following implementing resolution is recommended.

PROPOSED IMPLEMENTING RESOLUTION ON EXPERIMENTAL SAFETY VEHICLES

Date:__________

The Nations of the Alliance with reference to the International Resolution on Road Safety approved by the North Atlantic Council on November 28, 1973:

Considering that improvements in the overall safety performance of automobiles, trucks, buses, motorcycles, and other categories of vehicles can substantially reduce highway crash fatalities and injuries to vehicle occupants, cyclists, and pedestrians;

Considering that these improvements must not meanwhile lead to a significant increase in the weight of vehicles, which could have the effects of making driving more difficult and increasing fuel consumption and, consequently, atmospheric pollution;

Considering that such improvements must be incorporated into a vehicle as a total system which itself is a part of the larger overall traffic system; i.e., automobiles, trucks, buses, cyclists, and pedestrians;

Considering that such improvements must not result in costs that deny the average citizen the use of motor vehicles; ·

Recognizing that significant research and development remains to be accomplished before the most cost-effective safety requirements can be generated;

Recognizing that the major automotive producing nations of the world have joined together to advance the state-of-the-art in automotive safety technology; and

Regarding the Experimental Safety Vehicles Project, under the direction of the United States as part of the NATO CCMS Road Safety Pilot Study, as having:

- established the possible upper limits of safety performance
- demonstrated the practicality of the total systems engineering approach to vehicle safety and the problems associated with the introduction of advanced safety design solutions into mass-produced vehicles
- identified research areas which require substantial effort before the most cost-effective safety design can be developed;

Do Hereby Resolve:

1. To continue under the existing Memoranda of Understanding and associated Technical Annexes:
    - collaborative research on improved vehicle safety subsystems and advanced safety vehicles in a way which would simultaneously deal with the problems of cost, weight, fuel consumption and atmospheric pollution
    - exchange of the resulting technical information;
2. To coordinate international safety vehicle development, testing and related research, and plan and schedule international conferences and other forms of information exchange in periodic meetings of policy-level government officials representing interested nations;
3. To cooperate in conducting research in the following areas identified by the ESV Project as requiring additional efforts to:
    - develop modalities for expediting the incorporation of ESV results into production vehicles
    - reduce additional weight resulting from ESV design
    - reduce aggressivity in collisions between vehicles or between them and pedestrians
    - improve "primary safety" (steering, braking, suspension)
    - provide for human tolerance to impact force
    - improve anthropomorphic dummies
    - perform cost-benefit analysis based on better accident data
    - improve crashworthy structural design
    - provide more efficient restraint systems
    - standardize test procedures; and
4. To meet at approximately yearly intervals to report on the status of safety vehicle development research and present and discuss testing and other results.

PART THREE

INTERNATIONAL COORDINATION AND COOPERATION

International Exchange of Road Safety Action Programs
Coordination of Post-Pilot Study Activities

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PART THREE INTERNATIONAL COORDINATION AND COOPERATION

International Exchange of Road Safety Action Programs

A principal objective of the Road Safety Pilot Study is to stimulate road safety action by governments. This reflects what perhaps is the most fundamental reason for creating CCMS in the first place. Furthermore, such action should both significantly reduce traffic deaths on the implementing government's highways and assist other governments in achieving similar reductions. The principle of governments mutually assisting each other, while upgrading their own national road safety programs, is expressed in the International Resolution on Road Safety, under which nations of the Alliance agree:

> "... to intensify their existing national road safety programs and/or augment them with action programs that for each member nation are best suited to the problems it will have to solve to meet the above goals, and to exchange with other member nations their action plans as soon as possible but no later than September 1974 ... "

A systematic description of each country's national road safety program is essential to any meaningful road safety technology exchange. To help and be helped by other nations, each country must be able to describe what it is doing in a way that will permit each country to assess this experience in terms of its own programs. The issue at hand is what should be the vehicle for effecting this systematic description of road safety programs and action plans.

During the course of the Pilot Study, numerous impediments to the exchange of information became evident, particularly in the questionnaire work of the various projects. What would have appeared to be comparatively straightforward requests for information turned out to pose problems to other governments. Several reasons for this became apparent. Vast differences exist among the road safety programs of the members of the Alliance. These differences relate both to substance and organizational arrangements for policy and line management. Priorities are not the same; nor are operational procedures for meeting them. No less a problem is the magnitude of resources that each country can allocate to participation in international initiatives in road safety.

From this experience, it becomes unmistakably clear that for effective international transfer of road safety technology a uniform method of some sort is required. This will enable experts and officials of one government to understand the essence of what others are doing and accomplishing in road safety despite broad differences in program plans, activities, and priorities. Thus, the development of a uniform procedure for exchanging road safety information should start with the premise that the information will be coming from diverse perspectives among participating nations.

Given this premise, sound criteria for an effective working document to effect the exchange should:

1. Be simple, calling for direct, short, and unambiguous responses.
2. As an ultimate goal, be complete, covering the totality of a comprehensive road safety program, but recognizing that participating nations might not be in a position to report on all items nor on all program areas initially.
3. Be an executive document, limited strictly to the most important data and information on items that warrant being brought to the attention of high-level officials.
4. Be amenable to progressive updating, dropping items that no longer merit executive attention and adding new items as appropriate.
5. Not require substantial resources to be completed, and utilize whatever appropriate information that can be extracted from other sources.

A document embodying these criteria was prepared for most of the project areas for use as a basis of discussion at a workshop in Paris in June 1973. Numerous comments were offered, and since have been taken into account in preparing a second version which is set out in Appendix 4. As was the case with the earlier version, the newer form is presented here solely for purposes of illustration, and not for adoption. In fact, no form should be adopted except after thorough review by experts from participating nations. For that matter, even the idea of having any form as the vehicle of program exchange should be the subject of general review before it is accepted.

The illustrative form in the appendix is in the style of a document which each participating nation would complete annually for mutual exchange. Intended for review at very high-levels of government, it is limited to items of information that merit executive attention. Detail is therefore kept to a minimum, much in the form of a checklist. Lengthy descriptions, rhetoric, and supportive explanations are not encouraged. This is in the interest of simplicity, ease of preparation, and minimum time demands upon the readers who typically will be very busy high-level officials. The material is organized in three parts: Road Safety Program Personnel, Vehicle Accident Information, and Road Safety Action Program.

ROAD SAFETY PROGRAM PERSONNEL

The first part calls for listing the name, title, and agency of the principal official with technical-policy responsibilities for road safety in the reporting countries. This is followed by the names of the principal program managers for each of the selected areas of road safety activity.

The inclusion of this information stems from the fact that during the course of the Pilot Study, all of the project directors experienced difficulty at some point in learning the identity of the appropriate official with substantive policy authority in the particular area of activity.

VEHICLE ACCIDENT INFORMATION

In any executive summary of a road safety program, it is useful to present selected statistics that describe the scope of the problem. Comparison with similar data from previous reporting periods and from other countries then enables assessments of progress.

In this part, the reporting nation presents the statistical measures called for in the International Resolution on Road Safety, specifically, the annual number of deaths for each class of road user on its road networks. The pertinent section of the Resolution states that the members of the Alliance have adopted as a common goal:

> "... To use their best efforts to prevent any increase in the annual number of traffic deaths for each class of road user on their road networks over the next five-year period, and thereafter to reduce such number progressively."

In addition to the traffic fatality information required for the Resolution, this part also calls for data on traffic death rates and the frequency of accidents. The latter are indicators of the effectiveness of measures aimed at preventing the occurrence of crashes. These are "primary safety" measures in contrast to "secondary safety" provisions for reducing injuries once crashes occur. Many experts believe that accident frequency information might be more useful in planning and assessing safety program effectiveness than data on fatalities which have a greater impact on the general public.

ROAD SAFETY ACTION PROGRAM

This part of the document contains a separate section for each subprogram in the overall national road safety program. Each section stands on its own and is capable of being extracted from the main report and circulated among officials with specific responsibility in that program area. Each section identifies the principal government official with management responsibility for the program. This is followed by data items that portray the extent of the problem to which the particular action program is directed. The data also facilitate assessing the progress pursuant to implementing the sections of the Resolution under which the nations of the Alliance resolve:

> "... Each of them to monitor and assess at least every two years the results of the action programs mentioned below; and
>
> "To cooperate in reexamining (those) programs and the (above) goal in light of these assessments ..."

The last part of the section for a program action consists of a check-list report on the status of action taken by the reporting country on actions called for in the implementing resolutions.

It is recognized that the foregoing represents a very demanding format despite the fact that it calls for terse and simple responses to each item. Moreover, it is not known if enough governments can respond to a given item to make an exchange worthwhile. Nevertheless, in the opinion of experts, the requests are technically sound and would be of value to participating nations. Even if a government cannot respond to several items at the outset, the fact that useful measures of program performance are identified will suggest activities that might be considered for implementation.

Perhaps the most difficult, and yet one of the most important aspects of the exchange of program information and, for that matter, the implementation of the Resolution itself, is the definition of meaningful statistical measures. Without statistical indicators of proven validity, it is virtually impossible to assess the effectiveness of alternative approaches to road safety action. With such measures, it becomes quite straightforward to evaluate progress by comparing the current year value of the defined statistical measure with that of the previous year or some agreed upon base year.

To illustrate this approach, consider that one of the goals in the alcohol and highway safety program is to reduce the percentage of drivers with high (to be defined) concentrations of alcohol in their blood. Shifts in this value from one year to the next will specifically pinpoint the success of programs aimed at getting people to reduce their drinking before driving their cars. Comparisons of changes achieved by one country with those achieved by others will, other things being equal, highlight the comparative effectiveness of the different countermeasures used by each.

As another example, consider that several nations adopt the goal of increasing safety belt utilization. To achieve this goal, one nation might initiate a promotion campaign while another might enact a law making it mandatory for safety belts to be worn. A comparison of the changes in levels of safety belt usage would provide a measure of the comparative effectiveness of propaganda versus mandatory laws.

The importance of having precisely defined numerical measures of performance in each program area cannot be emphasized too strongly. Lack of care and foresight in defining and collecting such data elements has caused virtually every road safety agency much delay, difficulty, and expense. Experts who enthusiastically call for their governments to invest in specific program activities should be equally willing to define ways of measuring the effectiveness of their proposals once placed into operation. Much thought obviously should be given to selection of data elements that will with greater certainty measure the results of a program and minimize the measurement of the effects of something else that is happening concurrently.

In reporting progress toward meeting the statistical goal adopted in the Resolution, each nation will in some way compile traffic fatality totals for each class of road user and travel data. Collecting the data should not present any substantial problem since such data could undoubtedly be extracted from other statistics routinely compiled by each nation for its own purposes. However, collecting data that measures the effectiveness of program elements will probably cause many nations numerous problems at the outset. Nevertheless, it is essential to initiate the needed effort to collect these data, at least on a sampling basis, for without such data, program planning and establishing priorities are near idle exercises.

One of the problems confronting all data requirements relates to uniformity of definitions of the data items involved. For example, there is not as yet among all nations a single, generally accepted definition of a traffic death. Would the most appropriate definition be one in which the victim would die within 24 hours of the crash? Within 30 days? Within a year? Obviously, cross comparisons of absolute numbers of deaths are possible only when all data are adjusted to a common definition (the 30-day definition is suggested in the Appendix). However, the process of statistical data exchange pursuant to the Resolution can proceed even in the absence of agreement on definitions (which nonetheless should be sought on a priority basis), provided that a participating nation uses the same definition from one year to the next or makes appropriate statistical adjustments for change.

The preceding observations relate to the document prepared for purposes of this Report as a basis for suggesting and explaining the need for some format to facilitate the exchange of road safety information at high-levels of government. As stated previously, the document was not prepared with any intent to secure its adoption. The next step should be that interested nations agree to work collectively to arrive at a consensus both as to its substance and the usefulness of such a document. A recommendation to this effect is made later.

Assuming that several nations agree to develop a document for exchanging road safety information, several issues must be considered. One of the more difficult will be the scope of coverage, both as to the number of program areas to be reported on by participating nations, and the items for inclusion in each. A tendency might be to call for information only on current activity and for which information can be obtained with relative ease and low cost. Although initially the program areas covered may be limited, ultimately it would be better for the document to cover the significant aspects of a comprehensive road safety program, regardless of whether every participating nation can respond to all items. As stated previously, at a minimum, bringing to the attention of a high official of a government the fact that a listed item cannot be completed by his government might provide the impetus for initiating needed activity. Thus, it would appear preferable to adopt a program exchange document that would place challenging demands and perhaps stretch the capabilities of operating safety authorities of participating countries rather than to settle for one that would have little meaning or do little to aid policy-level decisions. This then is the course implicit in this trial document.

The concept of organizing the international exchange of road safety knowledge, skills and working experience around a single document designed for this purpose is new. There are no exact precedents, and thus no report form can be expected to be entirely satisfactory at the outset. In fact, a certain amount of trial and error will occur in numerous modifications until one that meets all criteria finally evolves. Nonetheless, the effort appears to be most worthwhile and in the long run can provide for a more effective international exchange than has heretofore been possible.

RECOMMENDATIONS

1. That interested nations organize an ad hoc group to develop a format for exchanging policy-level information on salient aspects of their respective road safety programs and progress. The resulting format would serve as the vehicle for:
   a. Implementing the information exchange aspects of the International Resolution on Road Safety; and
   b. Informing high-level government officials of road safety activities underway in other countries that they might wish to imitate.
2. That once a format is agreed upon, it be tested on an experimental basis for two reporting periods, each covering one calendar year of road safety effort.
3. That after two years of application and experience, the utility of having such a document be examined in the context of the intervening experience, and a decision made as to its continued use either in original or modified form or not at all.
4. That for purposes of exchanging information on programs by September 1974 as called for in paragraph 3b of the International Resolution on Road Safety, unless interested nations develop a format as called for in paragraph 1 above, the format in Appendix 4 be utilized and the program areas covered in the exchange be primarily those illustrated.

Coordination of Post-Pilot Study Activities

A principal objective of the CCMS Pilot Study is to organize road safety knowledge and to identify operational techniques of proven effectiveness in order to assist the nations involved to augment or intensify their road safety programs. As a result of Pilot Study activities, this report contains numerous recommendations for national and international action, including international cooperation, which must be translated into national action. Most of these recommendations relate in one form or another to broadening the base of technical information on road safety. Followup to the Pilot Study will include:

1. Recommendations for implementing resolutions (IRs) to the International Resolution on Road Safety – whether presented in project reports of the current Pilot Study, or suggested in the future.
2. Recommendations for continuing or new field demonstrations or other cooperative field work under bilateral or multilateral arrangements. (The results of these efforts might later provide the basis for drafting a proposal for some new IR to the Resolution.)
3. Recommendations to harmonize critical definitions and other aspects of a comprehensive road safety program.
4. Recommendations to develop and test some format, as described in the preceding section on International Exchange of Road Safety Action Programs. (This format will simplify and facilitate the exchange of road safety action program information called for in the operative section of the International Resolution on Road Safety.)

It is apparent that some means of coordinating multilateral participation in all of these followup efforts will be most useful and necessary if the full benefit of the study work is to be realized. Furthermore, these followup efforts may involve a number of different types of international cooperation, both multilateral and bilateral. In the past, in addition to CCMS, several international organizations made substantial contributions to the road safety field. Among these are the Organization for Economic Cooperation and Development (OECD), Working Party 29 of the Economic Commission for Europe (WP 29 of the ECE), the International Road Federation (IRF), the International Standards Organization (ISO), and the European Conference of Ministers of Transport (ECMT).

Regardless of where the technical work is carried out, experience gained in the Pilot Study leads to the conclusion that an orderly approach to international cooperation on road safety is now even more necessary than before. When it is considered that resources for international cooperation in the road safety field are decidedly limited and that a country's best experts must devote first priority to design and implementation of national programs, it is of particular importance to establish priorities as to which areas of international cooperation require most urgent attention.

Finally, to be effective, international technical cooperation must concentrate on a few areas at a time. Realistic goals must be set within relatively short-term frames to develop better indices for spotting road hazards, better instruments for measuring the incidence of alcohol in drivers, etc. Yet, all of these highly technical areas of cooperation must be carried out as much as possible in accordance with some kind of coherent overall plan, and that plan should be developed by government officials responsible for national road safety policy in those countries which have both the problem and the means to deal with it, as well as the habit of dealing with one another.

In order to provide a mechanism to coordinate followup recommendations of the CCMS Road Safety Pilot Study and the International Resolution on Road Safety, it is proposed that interested countries voluntarily work within an ad hoc group in which:

1. Interested members of the Alliance and possibly others coordinate the followup actions called for in the final Pilot Study and project reports.
2. Membership of the group include *high-level technical-policy officials.*
3. A chairman be elected on a rotating basis, and meetings be held as required.
4. Reports to CCMS be presented by the chairman of the group, at a minimum of once a year.

(The reports would be designed to aid CCMS in its review of progress in implementing Pilot Study recommendations. Implementing Resolutions would be submitted to CCMS in this manner.)

5. An assessment of the work to followup the action recommendations presented in the Pilot Study and project reports be made, and priorities and associated schedules be established.

What is proposed is that policy and technical officials of the key Western industrialized nations concerned with road safety meet periodically to decide what international actions need to be taken and how. These same officials would review progress with respect to on-going international road safety activities, including implementation of Pilot Study recommendations. They would act as a catalyst for assuring that future international road safety cooperation, no matter the international organization under whose aegis the work is performed, is effectively carried out. They would continue their coordination activity so long as they believed it useful.

The ad hoc and flexible nature of this proposal cannot be emphasized too strongly. In the June 1973 workshop, several delegations expressed concern over any proposal which would set up some new standing organization in the wake of the final Pilot Study Report. The viewpoint was also expressed that existing international bodies can meet present and foreseen needs for coordination of programs and exchange of information in the road safety field. However, CCMS, through the activity of an ad hoc group, could readily add an important new dimension to international cooperation in road safety; namely, *to provide policy-level support for technical initiative.* While many representatives at the workshop recognized that the ad hoc group could facilitate CCMS support, all delegations shared the concern over its becoming another standing organization that would generate more meetings and associated workload for experts and their governments. For this reason, the proposal was, and is now made strictly in the context of a ***self-starting, self-governing ad hoc effort of nations interested in jointly pursuing recommendations made by the Pilot Study.***

Essentially, the idea is for interested nations to establish the merits and relative importance of some proposed road safety activity and then seek the most expeditious ways of engaging in the activity. Modalities in this respect might include voluntary action on the part of some interested ad hoc group of nations, or stimulation of activity in an existing international organization, foundation, industrial association, or individual company.

The United States is prepared to strongly support this ad hoc group but, at least at the outset, would not wish to be chairman. Otherwise, the impression might be created that the Pilot Study was continuing indefinitely. This would not be in keeping with the fundamental CCMS concept that pilot studies are terminated as soon as predefined specific assignments are completed.

There are no exact precedents, at least in road safety, for having a voluntary group coordinating international road safety cooperation on an ad hoc basis. Although this approach is untested as yet, it has promising potential for ensuring followup on implementing the Pilot Study recommendations *without creating secretariats or standing organizations.* At this time, it is unfortunately a fact of life that no single organization in the road safety field could accomplish "across-the-board", policy-level coordination without changing its charter.

Therefore, it is recommended:

- That interested nations in the Alliance, taking into consideration the broad array of followup actions stemming from the recommendations of the Pilot Study, organize a group that would:
  a. Coordinate Road Safety Pilot Study followup efforts; and
  b. Report to CCMS on progress in this respect.

PART FOUR

OVERVIEW

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PART FOUR

OVERVIEW

CCMS was created to stimulate high-level government action on problems of social concern. With vehicle crashes killing over a half million people in NATO countries every four years, the need for high-level attention to traffic fatalities hardly warrants further elaboration.

The ensuing Road Safety Pilot Study has met this need, generating in the 3½ years since its inception, an international effort of unprecedented proportions. With some of the world's leading experts participating, the projects developed methodologies which nations can immediately and profitably incorporate into their action programs:

- Protocols for conducting national roadside screening surveys of breath alcohol (Alcohol and Highway Safety Project led by Canada).
- Protocols for conducting research-type accident investigations by medical-engineering teams (Accident Investigation Project led by the Netherlands).
- A methodology for evaluating the quality and effectiveness of the emergency medical services provided to traffic victims (Emergency Medical Services Project led by Italy).

Further, new ideas were advanced which can be expected to change national perspectives. French engineers during the course of the Experimental Safety Vehicle Project introduced the concept of "vehicle aggressiveness." This concept describes a motor vehicle's capability to cause injuries to occupants of another vehicle or pedestrians, and is now widely recognized as important to automotive design. In the United States, occupant protection, and most recently the susceptibility of a vehicle to property damage at low speeds of impact, commanded most of the regulatory attention. As a result of the Pilot Study, "vehicle aggressiveness" was incorporated into U.S. regulatory planning.

While the United States took greater account of the aggressiveness concept, European countries and Japan became more aware of the importance of occupant protection in vehicle design. The life-saving potential of U.S. standards incorporating secondary safety requirements is now well documented and common knowledge. One U.S. study estimates that the United States Federal Standards, which came into effect in 1968 and require energy absorbing steering columns, nonlacerating windshield glazing, and safety belts, together produced a 56 percent reduction in vehicle occupant fatality risk. The four widely publicized and heavily attended International ESV Conferences, held as a part of the Pilot Study, effectively destroyed the myth that much better occupant protection properties cannot be achieved in smaller European and Japanese cars without significantly increasing their size, weight or price.

Apart from broadening road safety perspectives and adding new concepts, the Pilot Study defined deficiencies in certain national road safety programs:

- More lives per unit of expenditure are often saved in correcting certain high-risk locations in existing roads than in building new roads. Budget allocations do not reflect this well-demonstrated finding, because new road construction provides for more rapid transit and is much more visible to the public (Identification and Correction of Road Hazards Project led by France).
- Although motor vehicles kill more pedestrians than any other single class of road user (accounting for as much as 34 percent of all traffic fatalities in some countries), national commitments to improving pedestrian protection is nowhere near commensurate to the magnitude of the losses (Pedestrian Safety Project led by Belgium).

In addition to pinpointing these and other potentially high payoff programs, the Pilot Study identified on-going national programs, the effectiveness of which are thus far difficult to determine:

- Although it is obvious that a vehicle in dangerous mechanical condition (e.g., with poor brakes) can cause accidents, it is not accurately known as yet the extent to which such defects are present in vehicles involved in crashes. Also unknown is the extent to which motor vehicle inspections identify defects which otherwise would cause crashes (Motor Vehicle Inspection Project led by the Federal Republic of Germany).

Another type of Pilot Study achievement involves the worldwide dialogue on automotive safety generated by the ESV Project. It was recognized from the start that this effort, among all the projects of the Road Safety Pilot Study, would present the severest test of CCMS capability to stimulate a significant exchange of technology among a major group of industrialized nations. From the outset, everyone involved was fully aware of the fact that manufacturers often view such exchanges as potentially advantageous to their competitors. The worldwide automotive marketplace is highly competitive and manufacturers who develop new vehicle safety technology, will wish to guard their proprietary rights in this respect. Finally, there was the question of the effect of such an exchange on automotive exports and imports. The success of the ESV Project in overcoming these obstacles is seen in the following excerpt from a late 1972 CCMS ESV Project Report:

> "The ESV (. . . Project has . . .) given rise to a tremendous investment of engineering manpower and physical facilities dedicated to advancing automotive safety. Millions of dollars and hundreds of people are working on developing experimental safety vehicles. The first three (now four) international ESV conferences resulted in *a greater exchange of automotive technology than has probably taken place in the history of the automotive industry. . ." (Emphasis supplied.)*

Notwithstanding these and other accomplishments, what merits most attention at this time is the need for Pilot Study followup and national and international action. The roadside procedures for screening drivers for breath alcohol, the protocol for conducting research-type accident investigations, the methodology for assessing the effectiveness of emergency medical services – all remain to be implemented. Similarly, a very large number of other recommendations require national and international actions. The resources used to produce these recommendations will be wasted unless steps are taken to ensure followup. Moreover, the Pilot Study considered only a selected number of road safety problem areas. For example, no work was undertaken in police traffic services and driver education. Much work is needed in these and other areas. Thus, the modalities for followup are now a primary consideration.

The keystone for effective followup is the International Resolution on Road Safety. It contains a general commitment on the part of members of the Alliance to augment or intensify existing road safety action programs, to review periodically the CCMS progress in carrying out action programs, and generally to assist each other in substantially decreasing traffic deaths over the next decade. It is contemplated that technical recommendations for substantive program activities would be annexed to the Resolution by mutual agreement. Systematic yet simple procedures are needed to facilitate implementation of the operative sections of the Resolution. Otherwise, it may prove to be of limited usefulness.

In short, the CCMS Pilot Study reached the same juncture as that of other international groups equally dedicated to improving road safety. Technically sound recommendations were advanced. To what extent will they be implemented? Or, as has happened so often in the past, will they be ignored, despite the firm commitment to action embodied in the Resolution?

The recommendations presented in this Pilot Study report involve a vast amount of followup effort. Intensification of national road safety programs alone poses the need for a major effort on the part of each country's road safety experts. To conserve effort and assure reasonable workloads on the international side, it is most important to agree on which areas of cooperation require immediate attention. Realistic action programs in priority areas of cooperation must be designed for accomplishment within relatively short-term time frames, and carried out in accordance with some coherent overall plan. Such a plan should be developed by government officials who have the authority to make commitments for their governments and later see that the commitments are met.

As a result, there is urgent need for an effective mechanism for coordinating and setting priorities for international cooperation designed to improve road safety. If such a mechanism is not created, there is a significant risk that not much in the way of concrete action will result from the Pilot Study work.

It has therefore been proposed that interested countries, each represented by a high-level policy official, voluntarily meet periodically, on an ad hoc basis, to assess the work required to followup on the action recommendations presented in the Pilot Study and project reports. The group would establish priorities and associated schedules, review progress and present periodic reports to CCMS at least once a year.

Inasmuch as the concept of an ad hoc group has not as yet been tested, the United States, as Pilot Country, will, in parallel with the work of the group, continue to meet its followup responsibilities inherent in the Pilot Country concept This consists primarily of reporting to CCMS on national progress with respect to implementing the Road Safety Resolution and its implementing resolutions and other Pilot Study recommendations.

In summary, therefore, the Pilot Study substantially broadened the base for understanding the road safety problem and outlined procedures for effective implementation of its numerous action recommendations under the broad terms of the International Resolution on Road Safety. With each member of the Alliance making new commitments to implement the Road Safety Resolution, its implementing resolutions, and other actions to intensify its national road safety programs, and working jointly with the others in planning and carrying out international cooperative efforts, CCMS will have made a lasting contribution toward reducing the as yet increasing numbers of traffic deaths on the highways of the world.

Appendixes

International Motor Vehicle Fatality and Associated Statistics
History of Road Safety Pilot Study and Projects
International Resolution on Road Safety
Format for Exchanging Road Safety Action Programs (Illustrative)
Documents Published under the Auspices of the CCMS Road Safety Pilot Study

APPENDIX ONE

International Motor Vehicle Fatality and Associated Statistics

Tables 1 through 16 are international motor vehicle statistics and contain motor vehicle deaths, death rates, and associated highway, motor vehicle, and travel rate data. The tables cover the 15 NATO nations plus Sweden and Japan for the years 1968-72.

Sources for the data included the government of each country, the International Road Federation publication *World Road Statistics 1967-71*, the United Nations publication *Demographic Yearbook 1971*, the National Safety Council publication *Accident Facts*, the Federal Highway Administration publication *Highway Statistics*, and the National Highway Traffic Safety Administration publication *Highway Fatality Statistics*.

To make the figures comparable among countries, all fatality counts have been adjusted to deaths within 30 days of the accident. Most of the figures given for 1972 are estimates as are some of the figures for earlier years. "N.A." in tables means that data was not available.

Tables 17 and 18 relate to years of life lost from motor vehicle accidents and other leading causes of death in the United States. The source was *Vital Statistics of the United States* 1960 through 1969.

TABLE 1

REPORTED MOTOR VEHICLE DEATHS

(Adjusted to deaths within 30 days of the accident)

COUNTRY	1968	1969	1970	1971	1972
Belgium	2,673	2,696	2,949	3,066	3,175
Canada	5,168	5,272	4,937	5,416	5,780
Denmark	1,096	1,190	1,208	1,213	1,150
France	16,079	16,518	16,935	18,092	18,666
Germany, Federal Republic of	16,636	16,646	19,193	18,753	18,793
Greece	984	1,000	1,023	1,047	1,053
Iceland	6	12	20	21	32
Italy	9,988	10,173	10,394	10,271	N.A.
Japan	20,545	23,429	24,161	23,459	22,941
Luxembourg	106	113	132	86	107
The Netherlands	2,851	3,020	3,130	3,121	N.A.
Norway	479	496	560	533	N.A.
Portugal	1,183	1,284	1,417	1,653	N.A.
Sweden	1,262	1,275	1,307	1,213	1,194
Turkey	3,747	3,760	3,978	N.A.	N.A.
United Kingdom	7,383	7,365	7,499	7,699	7,779
United States	53,765	54,880	53,704	53,606	55,860

TABLE 2
MOTOR VEHICLE DEATHS PER 10,000 TOTAL DEATHS

COUNTRY	1968	1969	1970	1971	1972
Belgium	220	226	249	258	272
Canada	336	344	318	346	N.A.
Denmark	232	248	250	248	227
France	291	288	314	328	N.A.
Germany, Federal Republic of	227	224	361	257	257
Greece	135	138	138	141	138
Iceland	43	83	137	140	N.A.
Italy	205	207	214	219	N.A.
Japan	301	344	340	344	337
Luxembourg	240	269	317	196	N.A.
The Netherlands	272	281	286	283	N.A.
Norway	127	127	145	137	N.A.
Portugal	125	127	152	174	N.A.
Sweden	153	153	163	147	142
Turkey	327	321	330	N.A.	N.A.
United Kingdom	113	112	114	119	N.A.
United States	279	286	280	280	285

TABLE 3
MOTOR VEHICLE DEATHS PER 1,000,000 PEOPLE

COUNTRY	1968	1969	1970	1971	1972
Belgium	278	279	306	316	326
Canada	250	251	232	251	265
Denmark	225	243	245	244	231
France	322	328	334	353	N.A.
Germany, Federal Republic of	276	274	317	306	305
Greece	112	114	116	119	118
Iceland	30	58	98	101	109
Italy	187	190	194	190	N.A.
Japan	203	229	233	223	213
Luxembourg	315	335	388	253	N.A.
The Netherlands	224	235	240	237	N.A.
Norway	130	130	140	136	N.A.
Portugal	125	134	148	N.A.	N.A.
Sweden	160	160	163	150	147
Turkey	108	108	111	N.A.	N.A.
United Kingdom	137	136	138	142	143
United States	268	271	262	259	268

TABLE 4

MILEAGE DEATH RATE

(Deaths per 100,000,000 km. of vehicle travel)

COUNTRY	1968	1969	1970	1971	1972
Belgium	8.8	8.5	8.7	8.7	8.7
Canada	4.6	4.4	3.9	4.1	N.A.
Denmark	5.1	4.9	4.1	4.1	N.A.
France	10.5	9.8	9.1	8.5	N.A.
Germany, Federal Republic of.	7.5	7.1	7.5	6.9	6.6
Greece	10.6	9.9	9.0	8.2	7.5
Iceland	0.9	1.8	3.0	3.0	3.0
Italy	8.5	7.6	6.6	5.8	N.A.
Japan	21.8	20.2	17.1	14.8	12.0
Luxembourg	N.A.	N.A.	N.A.	N.A.	N.A.
The Netherlands	5.8	5.5	5.3	5.1	N.A.
Norway	N.A.	N.A.	7.1	N.A.	N.A.
Portugal	N.A.	N.A.	N.A.	N.A.	N.A.
Sweden	3.8	3.7	3.6	3.2	3.1
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	3.8	3.7	3.6	3.4	3.3
United States	3.3	3.2	3.0	2.8	2.7

TABLE 5

ROAD DEATH RATE

(Deaths per 1,000 km. of road)

COUNTRY	1968	1969	1970	1971	1972
Belgium	29.1	29.3	32.0	33.2	34.3
Canada	6.2	6.4	6.0	N.A.	N.A.
Denmark	18.0	19.3	19.5	19.5	18.0
France	20.4	21.0	21.5	22.9	N.A.
Germany, Federal Republic of.	38.5	38.0	43.2	41.6	41.1
Greece	28.6	28.8	29.0	29.4	29.6
Iceland	0.5	1.1	1.8	1.9	2.1
Italy	35.2	35.8	36.5	35.9	N.A.
Japan	20.5	23.1	23.6	22.6	21.9
Luxembourg	23.9	25.5	29.7	19.3	21.6
The Netherlands	38.5	N.A.	40.7	N.A.	N.A.
Norway	6.9	7.0	7.7	7.3	N.A.
Portugal	39.6	42.9	47.0	N.A.	N.A.
Sweden	12.9	13.0	13.3	12.4	12.4
Turkey	63.0	63.0	77.0	N.A.	N.A.
United Kingdom	22.0	22.0	22.0	23.0	23.0
United States	9.1	9.2	8.9	8.9	9.2

TABLE 6

VEHICLE DEATH RATE

(Deaths per 10,000 registered vehicles)

COUNTRY	1968	1969	1970	1971	1972
Belgium	12.9	12.4	12.7	12.6	12.6
Canada	6.6	6.4	5.8	6.0	N.A.
Denmark	8.6	8.9	8.8	8.6	8.0
France	12.3	12.0	11.8	12.0	N.A.
Germany, Federal Republic of	10.7	10.1	10.7	9.7	9.2
Greece	29.7	27.1	24.7	22.5	20.2
Iceland	1.4	2.7	4.2	4.0	N.A.
Italy	9.3	8.9	8.2	7.4	N.A.
Japan	15.1	14.6	13.0	11.2	9.8
Luxembourg	10.4	10.6	11.6	7.1	8.4
The Netherlands	6.8	6.6	6.5	6.1	N.A.
Norway	5.1	4.9	5.1	4.1	N.A.
Portugal	27.1	26.0	25.5	N.A.	N.A.
Sweden	5.7	5.5	5.4	4.8	4.6
Turkey	14.2	12.9	13.3	N.A.	N.A.
United Kingdom	5.1	5.0	5.0	5.0	4.8
United States	5.2	5.1	4.8	4.6	4.6

TABLE 7

AREA ROAD DENSITY

(Km. of road per square km.)

COUNTRY	1968	1969	1970	1971	1972
Belgium	3.01	3.01	3.02	3.03	3.04
Canada	.08	.08	.08	N.A.	N.A.
Denmark	1.42	1.43	1.44	1.44	1.48
France	1.43	1.43	1.43	1.43	N.A.
Germany, Federal Republic of	1.70	1.80	1.80	1.80	1.80
Greece	.26	.26	.27	.27	.27
Iceland	.11	.11	.11	.11	.11
Italy	.94	.95	.95	.95	N.A.
Japan	2.66	2.68	2.71	2.74	2.78
Luxembourg	1.71	1.71	1.71	1.71	1.90
The Netherlands	2.20	N.A.	2.30	N.A.	N.A.
Norway	.21	.22	.22	.22	N.A.
Portugal	.34	.34	.34	N.A.	N.A.
Sweden	.24	.24	.24	.24	.24
Turkey	.07	.07	.07	N.A.	N.A.
United Kingdom	1.44	1.46	1.47	1.48	1.49
United States	.63	.64	.64	.65	.65

TABLE 8

POPULATION ROAD DENSITY

(Km. of road per 1,000 people)

COUNTRY	1968	1969	1970	1971	1972
Belgium	9.5	9.5	9.5	9.5	9.5
Canada	40.6	39.5	38.8	N.A.	N.A.
Denmark	12.6	12.6	12.5	12.5	12.9
France	15.8	15.7	15.5	15.4	N.A.
Germany, Federal Republic of	7.2	7.2	7.3	7.4	7.4
Greece	3.9	3.9	4.0	4.0	3.9
Iceland	54.9	54.0	53.7	53.8	52.9
Italy	5.4	5.4	5.3	5.3	N.A.
Japan	9.9	9.9	9.9	9.9	9.8
Luxembourg	13.2	13.2	13.1	13.1	14.2
The Netherlands	5.8	N.A.	5.8	N.A.	N.A.
Norway	18.2	18.5	18.6	18.7	N.A.
Portugal	3.2	3.1	3.1	N.A.	N.A.
Sweden	12.3	12.2	12.1	12.0	11.9
Turkey	1.7	1.7	1.7	N.A.	N.A.
United Kingdom	6.1	6.1	6.2	6.2	6.3
United States	29.6	29.5	29.3	29.2	29.2

TABLE 9

ROAD VEHICLE DENSITY

(Registered vehicles per km. of road)

COUNTRY	1968	1969	1970	1971	1972
Belgium	23.0	24.0	25.0	27.0	27.0
Canada	9.4	10.0	10.3	N.A.	N.A.
Denmark	20.8	21.7	22.2	22.7	22.6
France	16.5	17.4	18.2	19.0	N.A.
Germany, Federal Republic of	35.9	37.7	40.5	42.8	44.9
Greece	9.6	10.6	11.7	13.1	14.7
Iceland	4.0	4.0	4.3	4.7	4.9
Italy	37.8	40.3	44.5	49.0	N.A.
Japan	13.0	16.0	18.0	20.0	22.0
Luxembourg	23.1	24.1	25.6	27.2	25.9
The Netherlands	57.0	N.A.	62.6	N.A.	N.A.
Norway	14.7	15.8	16.5	17.8	N.A.
Portugal	14.6	16.5	18.4	N.A.	N.A.
Sweden	22.7	23.8	24.9	25.9	27.0
Turkey	4.0	5.0	5.0	N.A.	N.A.
United Kingdom	44.0	45.0	45.0	46.0	47.0
United States	17.4	18.0	18.5	19.2	20.1

TABLE 10

POPULATION VEHICLE DENSITY

(Registered vehicles per 1,000 people)

COUNTRY	1968	1969	1970	1971	1972
Belgium	215	226	241	250	259
Canada	381	393	399	418	N.A.
Denmark	261	273	279	284	290
France	261	272	283	293	N.A.
Germany, Federal Republic of	258	271	297	315	332
Greece	38	42	47	53	58
Iceland	217	216	231	255	259
Italy	203	215	237	255	N.A.
Japan	134	157	179	198	217
Luxembourg	304	317	335	355	371
The Netherlands	332	353	370	391	N.A.
Norway	268	291	307	332	N.A.
Portugal	46	52	58	N.A.	N.A.
Sweden	281	292	303	311	321
Turkey	8	8	8	N.A.	N.A.
United Kingdom	268	273	276	286	297
United States	514	530	543	562	587

TABLE 11

ROAD TRAVEL DENSITY

(1,000 km. of vehicle travel per km. of road)

COUNTRY	1968	1969	1970	1971	1972
Belgium	329	345	366	380	393
Canada	133	143	153	N.A.	N.A.
Denmark	355	397	408	406	N.A.
France	N.A.	N.A.	N.A.	N.A.	N.A.
Germany, Federal Republic of	516	536	572	599	626
Greece	270	290	322	357	395
Iceland	59	62	62	64	70
Italy	413	470	546	622	N.A.
Japan	94	115	138	153	183
Luxembourg	N.A.	N.A.	N.A.	N.A.	N.A.
The Netherlands	667	N.A.	761	N.A.	N.A.
Norway	107	114	119	129	N.A.
Portugal	N.A.	N.A.	N.A.	N.A.	N.A.
Sweden	340	357	374	386	399
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	596	603	630	667	689
United States	276	289	300	316	335

TABLE 12

POPULATION TRAVEL DENSITY

(Km. of travel per person)

COUNTRY	1968	1969	1970	1971	1972
Belgium	3,140	3,290	3,500	3,620	3,740
Canada	5,140	5,662	5,933	6,177	N.A.
Denmark	4,458	4,988	5,112	5,677	N.A.
France	N.A.	N.A.	N.A.	N.A.	N.A.
Germany, Federal Republic of	3,699	3,858	4,192	4,402	4,637
Greece	1,061	1,149	1,290	1,448	1,575
Iceland	3,244	3,328	3,309	3,422	3,703
Italy	2,220	2,520	2,920	3,290	N.A.
Japan	930	1,135	1,365	1,512	1,790
Luxembourg	N.A.	N.A.	N.A.	N.A.	N.A.
The Netherlands	3,880	4,232	4,494	4,661	N.A.
Norway	N.A.	N.A.	N.A.	N.A.	N.A.
Portugal	N.A.	N.A.	N.A.	N.A.	N.A.
Sweden	4,209	4,386	4,551	4,669	4,809
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	6,392	6,532	6,840	7,008	N.A.
United States	8.147	8.504	8,807	9,223	9,790

TABLE 13

VEHICLE TRAVEL DENSITY

(1,000 km. of travel per registered vehicle)

COUNTRY	1968	1969	1970	1971	1972
Belgium	14.6	14.6	14.5	14.5	14.4
Canada	14.2	14.4	14.9	14.8	N.A.
Denmark	17.1	18.3	18.4	17.9	N.A.
France	N.A.	N.A.	N.A.	N.A.	N.A.
Germany, Federal Republic of	14.4	14.2	14.1	14.0	14.0
Greece	28.0	27.0	27.0	27.0	27.0
Iceland	14.9	15.4	14.3	13.4	14.3
Italy	11.0	11.7	12.3	12.8	N.A.
Japan	6.9	7.2	7.6	7.6	8.2
Luxembourg	N.A.	N.A.	N.A.	N.A.	N.A.
The Netherlands	11.7	12.0	12.2	11.9	N.A.
Norway	N.A.	N.A.	7.3	N.A.	N.A.
Portugal	N.A.	N.A.	N.A.	N.A.	N.A.
Sweden	15.0	15.0	15.0	15.0	15.0
Turkey	N.A.	N.A.	N.A	N.A.	N.A.
United Kingdom	13.5	13.6	14.1	14.5	14.6
United States	15.8	16.0	16.2	16.4	16.7

TABLE 14
PEDESTRIAN DEATHS

COUNTRY	1968	1969	1970	1971	1972
Belgium	719	721	753	865	N.A.
Canada	1,164	1,189	1,148	1,110	N.A.
Denmark	300	329	327	318	N.A.
France	3,514	3,511	3,507	3,761	N.A.
Germany, Federal Republic of	5,342	5,199	6,056	5,577	5,301
Greece	N.A.	N.A.	N.A.	N.A.	N.A.
Iceland	1	6	7	6	6
Italy	2,804	2,668	2,836	2,722	N.A.
Japan	7,343	8,409	8,559	8,353	8,199
Luxembourg	24	21	34	25	25
The Netherlands	564	576	594	542	N.A.
Norway	140	179	182	168	N.A.
Portugal	N.A.	N.A.	536	611	N.A.
Sweden	260	255	308	243	226
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	2,762	2,955	2,925	2,939	3,089
United States	9,523	9,214	9,491	9,766	9,496

TABLE 15
BICYCLE DEATHS

COUNTRY	1968	1969	1970	1971	1972
Belgium	317	327	390	405	N.A.
Canada	152	146	128	165	N.A.
Denmark	148	166	152	150	N.A.
France	N.A.	N.A.	N.A.	831	N.A.
Germany, Federal Republic of	1,808	1,696	1,835	1,733	1,683
Greece	N.A.	N.A.	N.A.	N.A.	N.A.
Iceland	1	0	0	3	3
Italy	1,091	1,206	1,149	1,075	N.A.
Japan	2,580	2,852	2,796	2,518	2,531
Luxembourg	5	5	9	5	7
The Netherlands	481	498	479	518	N.A.
Norway	43	39	42	46	N.A.
Portugal	N.A.	N.A.	115	109	N.A.
Sweden	152	169	141	118	138
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	391	402	373	411	369
United States	774	784	804	833	1,014

TABLE 16

MOTORCYCLE DEATHS

COUNTRY	1968	1969	1970	1971	1972
Belgium	65	54	65	69	N.A.
Canada	196	178	195	209	N.A.
Denmark	46	40	42	39	N.A.
France	N.A.	N.A.	N.A.	619	N.A.
Germany, Federal Republic of	1,428	1,510	1,553	1,591	1,681
Greece	N.A.	N.A.	N.A.	N.A.	N.A.
Iceland	0	1	0	1	0
Italy	1,512	1,586	1,627	1,529	N.A.
Japan	4,043	4,236	4,239	4,237	3,727
Luxembourg	8	5	5	5	9
The Netherlands	92	76	85	95	N.A.
Norway	59	64	55	73	N.A.
Portugal	N.A.	N.A.	43	51	N.A.
Sweden	36	52	53	52	66
Turkey	N.A.	N.A.	N.A.	N.A.	N.A.
United Kingdom	616	581	564	600	603
United States	1,950	1,964	2,430	2,695	2,747

TABLE 17
YEARS OF LIFE LOST FROM VARIOUS CAUSES, UNITED STATES
(Thousands of person – years)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
					Diseases of Heart					
Male	6,410.0	6,385.2	6,542.2	6,696.6	6,617.0	6,684.4	6,793.3	6,707.3	6,826.4	6,634.3
Female	4,009.6	3,992.5	4,130.1	4,227.6	4,182.8	4,212.2	4,285.2	4,231.6	4,385.0	4,182.3
TOTAL	10,419.6	10,377.7	10,672.3	10,924.2	10,799.8	10,896.6	11,078.5	10,938.9	11,211.4	10,816.6
					Cancer					
Male	2,262.2	2,297.3	2,333.1	2,398.2	2,436.5	2,482.1	2,530.5	2,576.4	2,633.3	2,659.6
Female	2,392.7	2,428.8	2,456.4	2,491.6	2,514.6	2,558.0	2,583.1	2,622.9	2,662.3	2,671.4
TOTAL	4,655.0	4,726.0	4,789.5	4,889.8	4,951.0	5,040.1	5,113.5	5,199.3	5,295.7	5,331.0
					Stroke					
Male	1,001.4	989.9	1,002.1	1,020.9	1,002.8	1,006.4	1,012.9	990.7	1,037.8	1,007.7
Female	1,186.6	1,176.0	1,205.6	1,213.2	1,201.9	1,202.1	1,212.2	1,204.1	1,257.2	1,226.4
TOTAL	2,188.0	2,165.8	2,207.7	2,234.1	1,204.7	2,208.5	2,225.0	2,194.8	2,295.0	2,234.1
					Motor Vehicle Accidents					
Male	1,003.5	996.6	1,058.8	1,133.6	1,217.5	1,291.4	1,409.2	1,404.9	1,467.3	1,506.1
Female	392.3	392.1	433.1	459.4	509.0	527.5	582.4	581.8	598.9	624.1
TOTAL	1,395.8	1,388.7	1,491.9	1,593.0	1,726.5	1,818.9	1,991.6	1,986.6	2,066.2	2,130.1

Note: Totals may not add precisely because of rounding.
SOURCE: *Vital Statistics of the United States, 1960 through 1969.*

TABLE 18
EXPECTED WORKING YEARS LOST TO LEADING CAUSES OF DEATH
1960-1969 DATA TABLE, UNITED STATES

(Entries are in 1000 years)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
	Cause: Motor Vehicle Accidents									
Male	696	691	736	790	850	905	994	992	1,045	1,073
Female	237	237	262	279	310	322	359	359	372	389
TOTAL	933	928	998	1,069	1,161	1,228	1,353	1,352	1,416	1,462
	Cause: Diseases of the Heart									
Male	1,357	1,346	1,347	1,391	1,380	1,381	1,397	1,376	1,382	1,341
Female	522	511	518	531	520	515	513	501	514	476
TOTAL	1,879	1,857	1,885	1,921	1,900	1,896	1,910	1,877	1,896	1,817
	Cause: Cancer									
Male	732	735	743	763	776	782	796	801	813	818
Female	791	801	804	813	819	824	825	829	836	827
TOTAL	1,523	1,536	1,547	1,577	1,595	1,606	1,621	1,630	1,644	1,645
	Cause: Stroke									
Male	197	191	192	197	196	195	196	189	205	197
Female	191	187	195	190	193	190	186	191	200	192
TOTAL	388	378	387	388	389	385	382	380	404	390

Note: Totals may not add precisely because of rounding.

Working years are 20 to 65.

SOURCE: *Vital Statistics of the United States, 1960 through 1969.*

APPENDIX TWO

History of Road Safety Pilot Study and Projects

In April 1969, President Nixon proposed that NATO address environmental and other problems of modern industrial societies. Agreeing that NATO should study the idea, the North Atlantic Council set up a Preparatory Committee in May to determine how the Alliance could make a useful contribution in this area. In November, the Council created the Committee on the Challenges of Modern Society (CCMS), and directed it to promote the exchange of views and experience on improving the environment. CCMS was directed to consider specific problems which, if uncorrected, would significantly impair the quality of life in industrialized countries. The deliberate objective was to stimulate action by member governments.

CCMS held its first Plenary Session on December 8, 1969, at which time the United States submitted several proposals for pilot studies including a road safety program aimed at reducing traffic fatalities. The North Atlantic Council approved the road safety proposal on January 28, 1970.

A number of activities were then initiated under the auspices of this pilot study or in conjunction with it. The principal activities and the salient elements of progress are described next, in terms of approximately six month intervals between the CCMS Plenary sessions. The material is organized generally according to project activities.

DECEMBER 1969 - MAY 1970

A. Initial Technical Meeting, March 1970
B. Actions at CCMS Plenary, April 1970

A. Initial Technical Meeting

To initiate the study, the National Highway Traffic Safety Administration, U. S. Department of Transportation, invited all member governments to participate in a technical meeting in Brussels, March 23-25, 1970. Representatives from 12 countries attended: Belgium, Canada, Denmark, the Federal Republic of Germany, France, Greece, Italy, the Netherlands, Portugal, Turkey, the United Kingdom, and the United States. In advance of the meeting, the U. S. circulated outlines of eight proposed projects:

1. Increasing the Use of Safety Belts in Automobiles – Effective methods to increase the use of upper torso and lap belts by vehicle occupants.

2. Alcohol and Driving – Alternatives for dealing with drunk drivers, particularly problem drinkers.

3. Passive Restraints – Air bags and other alternatives which require no specific action by vehicle occupants for crash protection.

4. Operational and Research Investigations of Vehicle Crashes – Standardized methods for investigating crashes and describing injuries and vehicle damage.

5. Emergency Medical Response Systems – Methods for getting rapid and proper medical attention to injured motorists.

6. Experimental Safety Vehicles – Demonstrations of the technical feasibility of significant advances in automotive safety performance through design, development, and testing of experimental motor vehicles.

7. Identification and Treatment of Road Hazards[1] – Cost effective methods for identifying and correcting dangerous highway locations with high accident rates.

8. Road Safety Manpower Requirements – Types, qualifications, and number of professional, technical, service, and research personnel required to develop and implement road safety programs.

During the meeting, several additional candidate projects were informally suggested by other countries:

- International Year on Control of Drunk Driving (France).
- Road Safety Information Systems (the United Kingdom and others).
- Community Support (Greece).
- Translation (by NATO) of all Traffic Laws and Ordinances of Member Countries (Denmark).

The consensus was that most NATO governments were ready to participate in varying degrees in one or another of the cooperative road safety projects suggested. It was believed that information exchange and field demonstrations could materially aid participating countries in improving their national road safety programs as well as lead to CCMS action on Pilot Study recommendations. A major new dimension to the road safety field could be added through NATO's high level political support.

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[1] Title later changed to Identification and Correction of Road Hazards.

It was agreed that the overall Pilot Study, under the leadership of the United States, would consist of several projects. Each would be led by one or another country, other members and non-members would participate to the fullest extent possible. Industry would be strongly encouraged to participate, particularly in the Experimental Safety Vehicles and Accident Investigation Projects. All projects would concentrate on topics and activities which promise aid to officials of each country in planning and implementing initiatives keyed to their priorities. Care would be taken to guard against duplicating work already underway in the Organization for Economic Cooperation and Development (OECD), European Conference of Ministers of Transport (ECMT), and the United Nations Economic Commission for Europe (ECE) – Working Party 29 (WP 29).

It was further agreed that each country leading a project would prepare a final report. The United States as pilot country, in turn, would draw substantially from them in preparing the final report on the overall pilot study for submission to CCMS.

B. CCMS Plenary (April 13-14, 1970)

A report on the results of the first technical meeting was made to CCMS at its Second Plenary Session in Brussels, April 1970. NATO countries with automotible manufacturing industries were invited to cooperate in the Experimental Safety Vehicles Project to be led by the United States.

APRIL - OCTOBER, 1970

- **A. Passive Restraint Conference**
- **B. Accident Investigation**
- **C. Experimental Safety Vehicles**
- **D. Actions at CCMS Plenary**

A. Passive Restraints Conference

The first major conference held under the auspices of the Pilot Study was the "First International Conference on Passive Restraints." The meeting was strongly supported by the U. S. automobile industry, particularly the General Motors Corporation, and held at the General Motors Proving Grounds in Milford, Michigan, May 11 and 12, 1970. Over 400 engineers and experts from foreign and domestic manufacturers and from their governments participated in two days of intensive discussions, and witnessed live demonstrations of full scale crashes. This unprecedented international exchange of technology is documented in the conference proceedings published and widely distributed as CCMS Report No. 3.[1]

B. Accident Investigation Project

The first meeting on the Accident Investigation Project was held in Brussels, June 12, 1970. This meeting discussed the feasibility and desirability of an international system whereby accident data obtained by special medical-engineering teams in one country could be compared with similar data collected in other countries.

There was a consensus on testing the concept of an international exchange of accident data. If on the basis of a small sample of test cases the program appeared to be useful, recommendations would be made on more permanent arrangements. Interest in participating was advanced by Belgium, Canada, the Federal Republic of Germany, France, Italy, Japan, the Netherlands, Sweden, and the United Kingdom. The United States agreed to assist with training the teams, and to provide consultive advice.

The workshop was attended by delegations from eight countries plus observers from Japan and Sweden. The total attendance from government, industry, and the academic world was over 100, and included some of the world's leading medical experts in crash trauma.

C. Experimental Safety Vehicles

Separate technical discussions were initiated by the U. S. with the governments of every major automobile producing country with regard to participating in the international ESV effort. Because this initiative was of major importance to the automotive industry, company executives were included in many of the meetings. The NATO countries with which the U. S. started separate negotiations included: the Federal Republic of Germany, France, Italy, and the United Kingdom. Negotiations were also started with Japan and Sweden.

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[1] See Appendix 5 for availability.

The approach adopted by the U. S. sought separate bilateral agreements with each country prepared to sponsor an ESV program of its own in conjunction with its automotive industry. The U. S. emphasized that while its ESV effort would be limited to the 4,000 pound family sedan, it would be willing to cooperate with other countries undertaking ESV developments in smaller size and weight classes of vehicles. The U. S. would share the technology arising out of the 4,000-pound ESV program with other governments willing to share their advances in the smaller ESV developments.

As a first step in this unprecedented call for international cooperation, the U. S. distributed details (prepared over a period of three years) of the U. S. 4,000 pound (1,800 kg) ESV program to every government that expressed interest in a bilateral ESV agreement with the U. S.

D. CCMS Plenary (October 19-20, 1970)

It was recognized from the start, that distribution of project leadership responsibilities among participating nations would be critical to successful completion of the Pilot Study. Thus, following the initial technical meeting in March, the pilot study staff conducted numerous discussions with experts of member nations to identify additional areas of study and to agree on leadership assignments. The projects announced to the CCMS Plenary Session October 1970 were:

- Alcohol and Highway Safety – *Canada*
- Motor Vehicle Inspection (MVI) – *Federal Republic of Germany*
- Identification and Correction of Road Hazards – *France*
- Emergency Medical Services (EMS) – *Italy*
- Accident Investigation – *the Netherlands*
- Experimental Safety Vehicles (ESV) – *United States*

OCTOBER 1970 – APRIL 1971

A. Project Planning Meetings
B. Experimental Safety Vehicles
C. Accident Investigation
D. Alcohol and Highway Safety
E. Emergency Medical Services
F. Motor Vehicle Inspection
G. CCMS Plenary

A. Project Planning Meetings

Immediately after the October CCMS Plenary, and continuing throughout the winter of 1971, the pilot study staff conducted numerous technical meetings with experts assigned to lead projects by their respective governments. The primary purpose of these meetings was to develop general outlines of the activities to be included in each project. Preliminary discussions were also held with Belgian officials inviting them to lead a project on pedestrian safety.

B. Experimental Safety Vehicles

Bilateral ESV Agreements – The first bilateral ESV agreement was signed by the Federal Republic of Germany and the U. S., November 5, 1970; later, the second was signed by Japan and the U. S. on November 18, 1970. The U. S. continued negotiations for similar agreements with France, Italy, Sweden and the United Kingdom.

The First International Technical Conference on Experimental Safety Vehicles – Held in Paris, January 25-27, 1971, and hosted by the Government of France and the French Automobile Industry. About 80 government and industry representatives attended from Belgium, the Federal Republic of Germany, France, Italy, Japan, the Netherlands, Sweden, the United Kingdom, and the United States. The invited papers and open discussions related primarily to ESV design specifications. At this meeting, French engineers introduced the concept of "vehicle aggressiveness," since recognized as a new and important contribution to automotive engineering. The proceedings of the conference were subsequently published by the U. S. and distributed internationally to government, industry, and interested organizations.

European Coordination – the Federal Republic of Germany, France, Italy, and the United Kingdom established a "European Intergovernmental Committee on ESV" to coordinate research and developmental efforts on safety subsystems and components as related to each country's efforts in the CCMS ESV Project. The United Kingdom agreed to lead the work of this committee.

C. Accident Investigation

The second project meeting was hosted in Wolfsburg, Germany, October 21-22 by the Federal Republic of Germany, the Volkswagenwerk AG, and the German automotive industry. The principal topics were protocols for conducting the medical-engineering investigation of accidents and the proposed vehicle-deformation and injury-severity indices.

D. Alcohol and Highway Safety

The Government of Canada began work on the project by preparing a detailed questionnaire on alcohol and highway safety problems, and the effectiveness of alternative countermeasures. The questionnaire was sent to 44 countries.

E. Emergency Medical Services

The Italian leader of the Emergency Medical Services (EMS) Project, in consultation with U. S. experts, developed a questionnaire on EMS practices and problems and directed it to participating countries. Results of the questionnaire would provide the basis for more detailed project activity and action recommendations. Every participating country was invited to have one top EMS expert serve in a liaison capacity to the project.

F. Motor Vehicle Inspection

A questionnaire technique (similar to that adopted by the EMS Project) was chosen by the group leader of the project. A questionnaire was prepared on the salient issues of the safety inspection of vehicles in use, and was sent to all NATO governments.

G. CCMS Plenary (April 19-20, 1971)

Belgium announced it would lead a project on pedestrian safety. The U. S. reported that with the new Belgium initiative, the division of workload among the participating countries was complete and marked the end of the first phase of the Pilot Study. The U. S. also reported that the second phase involving detailed planning and implementation was well underway.

APRIL – NOVEMBER 1971

- A. Project Planning
- B. Experimental Safety Vehicles
- C. Accident Investigation
- D. Alcohol and Highway Safety
- E. Motor Vehicle Inspection
- F. Emergency Medical Services
- G. Identification and Correction of Road Hazards
- H. Pedestrian Safety

A. Project Planning

A meeting of all the Road Safety Pilot Study project leaders and the pilot study staff was held in Brussels on September 23, 1971, to discuss progress on each project and future plans.

B. Experimental Safety Vehicles

Bilateral ESV Agreements – The U. S. signed bilateral agreements with Italy on May 11, 1971, with the United Kingdom the same day, and with France on October 7, 1971. Negotiations were in progress on an agreement with Sweden.

Visits of Experts – During June 1971, a team of U. S. experts of the National Highway Traffic Safety Administration (the organization leading the Pilot Study, and ESV Project for the U.S.), visited the Federal Republic of Germany, France, and Italy, to review progress on ESV programs and to exchange viewpoints with European experts.

The Second International Technical Conference on Experimental Safety Vehicles – Held in Stuttgart, October 21-29, 1971, and hosted by the Federal Republic of Germany and the German automobile industry. The German Minister of Transport and the U. S. Secretary of Transportation addressed the opening session of the four-day meeting which was attended by over 400 delegates and observers. The two ministers conducted a joint press conference with more than 170 representatives of the world media. Technical papers describing progress and problems in ESV design and tests were presented by all ESV participants. Proceedings of the conference were subsequently published by the U. S. and distributed internationally.[1]

Anti-Trust Ruling – A number of ESV participants previously expressed concern that ESV research cooperation might be in violation of U. S. anti-trust laws. On July 21, 1971, the Attorney General of the United States ruled there would be no violation providing the cooperation did not result in retarding safety advances or in denying the benefits of such advances to any competing automobile manufacturer.

C. Accident Investigation

The third meeting of this Project was hosted by the Italian Government and Fiat S.p.A. in Turin, Italy, June 30 - July 2, 1971. At this time, about 25 European teams in nine countries were cooperating in testing the feasibility of a standardized reporting system for describing vehicle crash damage and human injuries. The teams exchanged field experiences in the use of the revised accident investigation protocols, made recommendations for further revisions, and resolved operational problems encountered during the early stages of the Project.

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[1] See Appendix 5 for availability.

D. Alcohol and Highway Safety

Questionnaire Replies – During this period, the Canadian project leader analyzed and evaluated the replies to the questionnaire (previously distributed in 44 countries).

International Protocols for Roadside Screening – For some time prior to the start of the Pilot Study, several countries conducted different forms of roadside surveys to determine the prevalence of alcohol in drivers. The Canadian project for CCMS took under advisement the feasibility of developing a standardized protocol for these surveys to enable comparisons of baseline data among participating countries.

To ascertain interest in the approach, the concept was outlined at a meeting of experts on September 21, 1971, in London. Although organized under the auspices of the British Medical Association, the meeting was essentially a continuation of an earlier effort by OECD Research Group on the Effects of Alcohol and Drugs on Driver Behavior. The presentation of the CCMS plan was made by the Pilot Study Director, following a report by the Canadian representatives on preliminary results of roadside screening trials in Canada.

Research scientists at this meeting agreed that uniform protocols for conducting roadside surveys offered promising potential for useful international exchange of data, and should be tested. The Research Group established two study groups: one led by a Canadian scientist to develop roadside protocols for an international program of voluntary roadside tests, and a second led by a U. S. scientist to develop standards for breath testing equipment. These standards would be valuable contributions to any subsequent multilateral effort on international roadside screening tests.

The Canadian Government initiated discussions with officials of other countries to ascertain interest in participating in the field studies. In support, the U. S. took under advisement the feasibility of inviting other countries to assist in field evaluations of a portable device it was developing for testing drivers' breath for blood alcohol concentration.

E. Motor Vehicle Inspection

The first meeting of participants in this project was hosted by the German Ministry of Transport in Cologne, Germany, on October 20-21, 1971. Among the actions agreed at this meeting were: (1) Germany would summarize the responses to the questionnaire which had been distributed earlier in the year, (2) the U. S. would prepare a report on automated diagnostics in motor vehicle inspection and another on the U. S. defects recall program, and (3) the United Kingdom would prepare a report on its changeover from a large number of relatively uncontrolled private inspection stations to a system with few well-controlled private stations.

In conjunction with this meeting, German MVI procedures and techniques were demonstrated. Visits were subsequently made to motor vehicle inspection related facilities in Belgium, Denmark, France, Italy, the Netherlands, the United Kingdom, and later the United States.

F. Emergency Medical Services

The Government of Italy (Ministries of Transport and Public Health) developed a questionnaire on EMS practices, and distributed it to NATO countries.

G. Identification and Correction of Road Hazards

The Government of France (Institute of Transportation Research) prepared a questionnaire on the road hazard problem and sent it to NATO countries. The survey aimed at obtaining data on the present state of knowledge with regard to methods for identifying and correcting road hazards in a cost effective manner.

H. Pedestrian Safety

On September 24, 1971, the Belgian Government hosted the first meeting of the Pedestrian Safety Project in Brussels. Eight NATO countries, and an observer from Japan, were represented. It was agreed at the meeting that the workload in developing a questionnaire and in evaluating country responses would be shared by Belgium, Denmark, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and the United States.

NOVEMBER 1971 – APRIL 1972

A. Experimental Safety Vehicles
B. Accident Investigation
C. Alcohol and Highway Safety
D. Emergency Medical Services
E. CCMS Plenary

A. Experimental Safety Vehicles

Bilateral ESV Agreement – The U. S. and Sweden signed a bilateral ESV agreement on March 15, 1971.

The international ESV effort now included all major automobile producing countries.

ESV Prototypes – Prototypes from two of the U.S. ESV contractors were delivered to the U.S. Government in December 1971, and the comparative test programs were started in January 1972. All participants in the International ESV Project were invited to have representatives at the crash tests conducted at a contract test facility in Phoenix, Arizona. These tests were also witnessed by a number of foreign and domestic press representatives.

B. Accident Investigation

In December, 1971, the U. S. funded a contract to furnish technical and computer assistance to the project leader in receiving, analyzing, and collating accident investigation case studies.

The Netherlands hosted a meeting of the Accident Investigation Coordinating Panel on April 11, 1972, at the Hague, where a schedule for the balance of the Project was adopted.

C. Alcohol and Highway Safety

To initiate development of standardized protocols for roadside surveys, the Canadian Government called a meeting in Ottawa, February 29 through March 3, 1972. This meeting was attended by scientists from six countries and produced a first draft of the roadside protocol.

D. Emergency Medical Services

In February 1972, a meeting of the EMS Project was held in Brussels at NATO Headquarters. Because of similar interests, participants in the CCMS Advanced Health Care Pilot Study EMS Project, which was just beginning, also attended the session. After a review of responses to the EMS questionnaire, transmitted to participating countries in the summer of 1971, the project leader formulated a small supplementary investigation comprised of 19 items of special EMS interest. Each item of the investigation was to be the responsibility of a specific country.

E. CCMS Plenary (April 18-19, 1972)

The CCMS approved a U. S. proposal to extend the Road Safety Pilot Study an additional year because, with broadened scopes and some unforeseen delay, projects could not be completed in time to meet the original schedule.

APRIL – NOVEMBER 1972

- A. Project Leaders Meeting
- B. Passive Restraints Conference
- C. Experimental Safety Vehicles
- D. Alcohol and Highway Safety
- E. Motor Vehicle Inspection
- F. Emergency Medical Services
- G. Identification and Correction of Road Hazards
- H. Pedestrian Safety
- I. International Vehicle and Highway Safety Conference
- J. International Resolution on Road Safety
- K. CCMS Plenary

A. Pilot Study Project Leaders Meeting

The Pilot Study Director met with project leaders in Washington, D. C. on May 29, 1972. The progress of each project was discussed and plans were made for completing the work and preparing the final report.

B. Second International Conference on Passive Restraints

This Conference was held in Detroit May 22-25, 1972, under the sponsorship of the CCMS Pilot Study, the U. S. National Highway Traffic Safety Administration, and the Society of Automotive Engineers (SAE). The General Motors Corporation hosted the meeting, at which a number of U. S. and non-U. S. experts presented papers and reports on alternative passive restraint developments. Conference proceedings were published and distributed by SAE.[1]

C. Experimental Safety Vehicles

Third International Technical Conference on Experimental Safety Vehicles – Hosted by the U. S., and held in Washington, D.C. May 30 to June 2, 1972. As in the previous two conferences, detailed progress reports and technical papers were presented by representatives of ESV participants. Conference proceedings were published by the U. S. and distributed internationally.[1]

ESV Exhibit at "TRANSPO 72" – The "United States International Transportation Exposition" or "TRANSPO 72" was held at Dulles International Airport near Washington, D. C., May 27 through June 4, 1972. Over a million people attended the exposition, including a large number of foreign visitors, particularly from Europe. One of the major exhibits was a CCMS geodesic dome housing twelve models of ESVs, some never shown before publicly. The ESVs came from the Federal Republic of Germany, Italy, Japan, Sweden, the United Kingdom, and the United States.

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[1] See Appendix 5 for availability

Visits of Experts – During August and September, 1972, a team of engineers from the U. S. Government visited ESV participants in Japan, Europe, and the U. S. Their report noted that the ESV program by that time had resulted in a greater international exchange of automotive technology than probably ever before in the history of the automotive industry.

D. Alcohol and Highway Safety

Working in cooperation with OECD, the Canadian Government obtained tentative agreements from 16 countries to participate in the proposed international program of roadside surveys of drinking-driving behavior. At the same time, the U. S. continued its work with NATO countries to initiate a cooperative program to test breath analyzers and develop performance standards.

E. Motor Vehicle Inspection

A meeting was hosted by the Federal Republic of Germany in Bonn, May 3 and 4, 1972, to evaluate the responses received from the questionnaire circulated in the spring of 1971, and to outline the final project report. In the absence of field tests, the opinions of experts from countries participating in the project were used as a basis for evaluating the cost effectiveness of alternative motor vehicle inspection measures. Participating countries agreed to update their questionnaire responses. The U. S. agreed to prepare a state-of-the-art paper on inspection technology, the United Kingdom agreed to prepare a special report on cost effectiveness of inspection, and Denmark agreed to prepare a special report on accident statistics.

The updated questionnaires and special reports were reviewed at an October 26-27 meeting in Berlin. The group determined that the draft final report did not meet all objectives, and a new approach was adopted. Each country agreed to prepare its own description of MVI in terms of a defined outline. The description was to include a discussion of their experiences and justification of each aspect of their program. The Belgian and United Kingdom representatives agreed to prepare the introduction. These documents were to be ready for the next meeting in the spring of 1973.

F. Emergency Medical Services

The EMS project staff participated in a meeting conducted by the CCMS Advanced Health Care Pilot Study in San Francisco October 15-19, 1972. The EMS sessions were attended by over 40 experts from 11 countries, plus observers from several non-NATO countries and the World Health Organization. At this meeting, the EMS Project's analytical mode for the appraisal of a nation's Emergency Medical Services meeting, the EMS Project's analytical method for the appraisal of a nation's Emergency Medical Services was presented. The EMS project leader also led a discussion on the results of the 19-item EMS questionnaire developed and circulated as part of the project. It was tentatively agreed that the EMS Project under the Road Safety Pilot Study would be phased into the broader EMS context of the Advanced Health Care Pilot Study.

G. Identification and Correction of Road Hazards

The Government of France sponsored a seminar on the Road Hazards Project, in Paris, on April 28, 1972. The meeting was attended by representatives of seven countries to discuss responses to the Road Hazards questionnaire previously circulated. As a result, French experts agreed to prepare a technical paper on "The Detection and Elimination of Accident Black Spots." This would be one of a series of papers on the same theme being prepared by experts from eight different countries for presentation at the Eleventh International Study Week in Traffic Engineering and Safety held in Brussels during September 1972. With the cooperation of French experts, the Belgian experts prepared a comprehensive summary report of these papers for presentation at the September meeting. The proceedings of the April meeting, and the papers subsequently prepared in the International Study Week, formed the basis for a preliminary draft of the Road Hazards Project Report. This report was circulated to the allies by France in November 1972.

H. Pedestrian Safety

The second project meeting of the Pedestrian Safety Project Group was held in Copenhagen, June 22-23, 1972. Responses to the Pedestrian Safety survey questionnaires were evaluated as were the technical papers submitted by experts from the participating countries. As a result of the meeting, it was decided that (a) the final report for this project should contain a small number of carefully chosen recommendations, (b) the Group should continue for approximately another year to incorporate the results of on-going studies, and (c) it would be desirable to present the conclusions and findings to a conference of decision-makers, not just technical safety experts. The question of vehicle design for pedestrian safety was also discussed, and a recommendation adopted that the importance of incorporating pedestrian protection requirements in ESV specifications be communicated to ESV participants.

I. International Vehicle and Highway Safety Conference

This conference sponsored by CCMS, the U. S. Government, and the Society of Automotive Engineers (SAE) was held in Washington, May 30 to June 2, 1972. Along with the ESV conference and exhibits it was held in conjunction with Transpo 72. The Conference included a variety of presentations and panels by international experts and government officials, plus a full session on the CCMS Road Safety Pilot Study. Introductory presentations to the CCMS session were made by the Acting Chairman of CCMS (NATO Assistant Secretary General for Scientific Affairs) and the Road Safety Pilot Study Director. These were followed by progress reports by each of the seven pilot study project leaders. Proceedings of the conference were published and distributed by the U. S. Department of Transportation and by SAE.[1]

J. The International Resolution on Road Safety

Looking toward the conclusion of the Pilot Study, the U. S. recognized the need for some form of general commitment under which NATO members would agree to translate the study's specific recommendations into firm action, and assist each other in substantially decreasing traffic death rates. In a major address in Washington, D. C. in June 1972, the U. S. Secretary of Transportation called for such a resolution to be introduced at the next CCMS Plenary Session.

In a round of discussions between pilot study staff and road safety experts of member nations, a preliminary draft of a resolution was prepared as a talking paper. These discussions were held during the fall of 1972, and produced a unanimously favorable response to the general concept of a resolution. However, considerable concern was expressed on the precise definition of a statistical goal to be included in the resolution.

During discussion of the resolution, several highly promising suggestions emerged. In order to achieve the goal of reducing traffic fatalities, it was thought that nations should agree to: (1) develop augmented road safety action programs; (2) exchange with other nations plans for these programs; and (3) thereafter periodically review, in CCMS, progress in carrying out announced action programs. A revised version of the resolution was accordingly prepared that reflected these suggestions. It was distributed for discussion at the November 1972 Plenary.

K. CCMS Plenary (November 14-15, 1972)

EMS Project – The U. S. announced that upon completion of the work in progress on procedures for assessing the adequacies and deficiencies of systems for providing emergency medical services to aid traffic victims, the EMS effort in the Road Safety Pilot Study would be phased into the Advanced Health Care Pilot Study. Trial procedures were undergoing tests in several locations in the United States and in several European countries. Once these tests were completed, work would proceed as part of the Advanced Health Care Pilot Study to expand the assessment procedures to cover emergency response to all medical crises including heart attacks, burns, industrial accidents and others.

Interim Recommendation on Alcohol and Highway Safety – At the request of the project leader (Canada), the U. S. introduced an interim recommendation calling for all nations to carry out roadside surveys to collect baseline data on alcohol and driving habits. It was recommended that these national roadside surveys be conducted with essentially similar methods so that valid comparisons of the effectiveness of alternative countermeasures could be made as soon as possible, and that surveys should start in 1973. The U. S. strongly urged all governments to undertake roadside surveys on drunk driving, using the methodology developed by the Canadian Alcohol Project, without waiting for formal CCMS action.

Interim Recommendation on Pedestrian Safety – At the request of the project leader (Belgium), the U. S. introduced an interim recommendation on vehicle design to protect pedestrians. Noting that on a worldwide basis the numbers of serious and fatal pedestrian casualties exceeded those of any other category of road user, the Pedestrian Safety Project Group had strongly recommended that the pedestrian injury problem be considered by governments as part of the ESV design programs. The Group recommended that national ESV specifications include elements designed to increase pedestrian protection, and suggested that, in principle, the same injury tolerance criteria which apply to car occupants for head and chest protection be applied to the pedestrian in a 20-mph impact. The Group further recommended that, once developed and validated, these ESV specifications be incorporated in motor vehicle design requirements as soon as possible. The U. S. recommended that (a) CCMS take note of the pedestrian safety project recommendations, (b) all countries participating in the ESV program give it full consideration in the development of their ESV specifications, and (c), ESV participants report on their conclusions at the next ESV conference.

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[1] See Appendix 5 for availability

International Resolution on Road Safety – At the Plenary, the U. S. presented a suggested plan and schedule for developing a consensus text of the resolution:

- An ad hoc workshop would be held in Europe in mid-February 1973 to resolve the language of the resolution and its statistical definitions, and prepare an ad referendum consensus text. Expected attendees were to include the Road Safety Pilot Study project leaders and a representative from each of the other member nations not represented by a project leader.
- The consensus text which would emerge from the February workshop would be tabled at the April 1973 Plenary.
- A second workshop would be held in June 1973 to examine in detail the action program aspects of the draft resolution and to resolve any remaining problems on the text.
- The consensus text of the resolution would be included in the draft final report of the Pilot Study, and circulated among member nations in September 1973.
- The U. S. would propose that CCMS adopt the Resolution at its fall 1973 Plenary.

Following the U. S. presentation, France offered to host both the February and June workshops as described above.

Pilot Study Completion – The U. S. presented a progress report and plans for completing the study. Some project reports were expected to recommend continued activities after the Pilot Study was ended, either (1) within CCMS or other international forums or bilaterally, or (2) as part of national action programs. It was suggested that action recommendations could be annexed by CCMS to the overall International Resolution on Road Safety. It was also recommended that:

1. All project reports should be submitted to the Pilot Country by July 1, 1973.
2. A draft of the final Pilot Study report should be circulated to member nations by October 1, 1973.
3. A general Road Safety Meeting might be scheduled in Europe immediately before the CCMS Fall 1973 Plenary to focus on:
   a. Public reports by the project leaders on their completed work and future plans.
   b. Implementing Resolutions to be annexed to the International Road Safety Resolution and stemming inter alia from the completed project work.
4. Formal adoption by the CCMS of the International Resolution on Road Safety should take place at the fall 1973 Plenary.

NOVEMBER 1972 – APRIL 1973

A. Experimental Safety Vehicles
B. Accident Investigation
C. Emergency Medical Services
D. Pedestrian Safety
E. International Resolution on Road Safety
F. Completion of Pilot Study Report
G. CCMS Plenary

A. Experimental Safety Vehicles

CCMS Exhibit – The Society of Automotive Engineers held its "International Automotive and Engineering Congress and Exposition" in Detroit, Michigan, January 8-12, 1973. A major exhibit featured the CCMS Road Safety and Air Pollution Pilot Studies. This exhibit, jointly sponsored by the U. S. Government and SAE, featured experimental safety vehicles (General Motors, Daimler Benz, Volkswagen, Fiat, and Ford) and examples of low pollution power system development (LPPSD) hardware (gas turbine, rankine cycle, and stratified charge cars with various associated engine and component mockups). The U. S. representative to CCMS addressed the meeting emphasizing automotive technology from a systems point of view.

Fiat Prototype ESV – A Fiat ESV in the 700 kg class was delivered to the U. S. Secretary of Transportation on February 13, 1973. This marked a significant milestone in the ESV program and the international exchange of technical data. On February 24-27, car-to-car crash tests were conducted on the vehicle at the test facility of a U. S. contractor in Phoenix, Arizona.

The Fourth International Technical Conference on Experimental Safety Vehicles – Held in Kyoto, Japan, March 13-16, 1973, and attended by well over 200 representatives from 11 countries. The comprehensive exchange of technical information included presentations by representatives from Alfa Romeo, British Leyland, Citroen, Daimler-Benz, Fiat, Ford, General Motors, Honda, Nissan, Renault-Peugot, Saab, Toyota, Volkswagen, and Volvo. In conjunction with the Conference, 10 ESVs were displayed (3 Fiats, General Motors, Honda, Mercedes, 2 Nissan, Toyota, and Volkswagen). Proceedings of the conference were published and distributed by the U. S. Department of Transportation.[1]

B. Accident Investigation

A meeting of the Coordinating Panel of the Accident Investigation Project was held at the Hague on March 26, 1973. By that time, the project's support contractor had completed the data handling and test analyses of 520 case reports which had been submitted by the participating countries. Key items discussed at the meeting were the final project report, plans for sustained activities after completion of the Pilot Study, and plans for a final accident investigation workshop in Brussels during June 1973.

C. Emergency Medical Services

Except for completion of the final report and initiation of European evaluations of the EMS assessment model, the Road Safety EMS Project was essentially complete. Progress was reported at an EMS meeting held in Lisbon, March 14-16, under the aegis of the Advanced Health Care Pilot Study. Following the Lisbon meeting, U. S. representatives delivered the EMS assessment model to Belgium and the Federal Republic of Germany for testing and critique. Additional followup visits were made to several U. S. States (New York, Pennsylvania, and Georgia) in April 1973 to discuss testing of the assessment model. The final EMS Project Report was subsequently prepared for review, printing, and distribution.[1]

D. Pedestrian Safety

Members of the CCMS Pedestrian Safety Group from Belgium, Denmark, and the United Kingdom visited the U. S., April 2-6, 1973, to observe a U. S. pedestrian safety demonstration project. Also present were the Secretary General of the International Federation of Pedestrians and the Chairman of the OECD Pedestrian Safety Group. The five-day visit entailed briefings on the demonstration project and inspection of the experimental pedestrian safety countermeasures being carried out at two sites, Washington, D.C., and Miami, Florida. During this visit it was agreed to hold a meeting in London during June to settle on final project recommendations.

E. International Resolution on Road Safety

The workshop, to draft a consensus text on the International Resolution on Road Safety, was held in Paris, February 26-27, 1973, and hosted by the Government of France. Delegates from eight nations attended (Canada, Denmark, the Federal Republic of Germany, France, Italy, the Netherlands, the United Kingdom, and the United States). The key accomplishment was ad referendum agreement on a consensus text of the International Resolution on Road Safety for introduction at the April CCMS Plenary. A followup workshop in Paris for June was also confirmed.

F. Completion of Pilot Study Report

On April 6, 1973, the Pilot Study Director sent a detailed letter to each project leader on preparation of project and pilot study reports. Attached to the letter were copies of the proposed International Road Safety Resolution, suggested implementing resolutions to be annexed to the Resolution and a proposed agenda for the June Road Safety Workshop to be held in Paris. The U. S. requested that project conclusions and recommendations be transmitted to the U. S. by July 1, 1973, and that the final text of the complete project reports follow as soon as possible.

G. CCMS Plenary (April 10-11, 1973)

The ad referendum consensus text of the International Resolution on Road Safety was jointly introduced by Belgium, the Federal Republic of Germany, France, the Netherlands and the U. S. at the Eighth CCMS Plenary Session in Ottawa, Canada. The Resolution generally was received favorably. However, while they supported the operative paragraphs of the Resolution, Denmark, Italy, Norway, and the United Kingdom expressed reservations on the goal of reducing the rate of traffic fatalities.

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[1] See Appendix 5 for availability

In conjunction with the Ottawa Plenary, Canada, assisted by the U. S., sponsored a NATO-CCMS exhibit on the environment which included ESV and LPPSD displays. The six day exhibit which was held at the Museum of Science and Technology just outside of Ottawa, was visited by approximately 21,700 people.

MAY – OCTOBER 1973

A. Experimental Safety Vehicles
B. Accident Investigation
C. Alcohol and Highway Safety
D. Motor Vehicle Inspection
E. Identification and Correction of Road Hazards
F. Pedestrian Safety
G. International Resolution on Road Safety
H. CCMS Plenary

A. Experimental Safety Vehicles

A draft of the final ESV Project Report was transmitted during June to project participants for comment. It was tentatively agreed that the Fifth International Technical Conference on Experimental Safety Vehicles would be held in London June 4-7, 1974.

B. Accident Investigation

A workshop on the Accident Investigation Project was held in Brussels, June 28-29, 1973. The form and content of the final project report as well as follow-on activity after project completion were discussed in detail. The Coordinating Panel (with nine countries represented) of the Project met the following day, agreed collectively to continue international cooperation and activity, and scheduled the next meeting for November 1973.[1]

C. Alcohol and Highway Safety

A meeting of experts on alcohol and highway safety was held at NATO Headquarters on October 16-17, 1973. The meeting, chaired by Canada and attended by representatives of 10 NATO nations, achieved the following:

1. Following a review of the final Canadian Project Report, alternatives for implementing project recommendations were explored and agreement reached on responsibilities for further investigations. Canada volunteered to collect, collate, and disseminate the results of roadside surveys.
2. Ad referendum agreement was achieved by the group on a draft implementing resolution to the International Resolution on Road Safety. It includes provisions for roadside surveys and international breath standards.
3. Canada and the U. S. agreed to complete followup actions on a proposed workshop on roadside surveys in Europe during late spring 1974. The U. S. noted it had made arrangements to provide a number of the hand-held portable breath testing devices, developed at the DOT Transportation Systems Center, to European survey teams who would like to use the device.

D. Motor Vehicle Inspection

A meeting of the Motor Vehicle Inspection Project was held in Washington, D. C., April 30 - May 4, 1973. Representatives of Belgium, Denmark, the Federal Republic of Germany (project leader), the United Kingdom, and the United States attended as the drafting committee for the final report. Each representative had previously prepared a report describing the basis for the conduct of motor vehicle inspection in his country. These reports were discussed, and the context and format of the final Project Report were agreed upon. The German project leader transmitted the final Project Report to the U. S. in the summer of 1973.[2]

E. Identification and Correction of Road Hazards

The draft report on the Identification and Correction of Road Hazards Project had been circulated to all participating countries and comments returned to the French project leader during early 1973. France transmitted the revised report to the U. S. in July 1973 for publication.[2]

F. Pedestrian Safety

The Pedestrian Safety Project's final meeting was held in London, June 18-20, 1973. Various recommendations were agreed upon and formally transmitted to the Pilot Study Director. The Belgian project leader transmitted the final Project Report to the U. S. in mid-July.[2]

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[1] See Appendix 5 for availability of published proceedings of this workshop.

[2] See Appendix 5 for availability.

G. International Resolution on Road Safety

The second workshop on drafting a consensus text of the International Resolution on Road Safety was held in Paris, June 13-15, 1973, and was attended by experts from seven NATO nations (Belgium, Canada, the Federal Republic of Germany, France, Italy, the United Kingdom, and the United States) and OECD. The group also discussed procedures and mechanisms for assuring effective implementation of the Resolution, once adopted by NATO. Consensus was achieved, ad referendum, on a text, with the United Kingdom representative expressing a reservation on the statistical goal, i.e., a specific percentage reduction of the rate of traffic deaths per kilometer. Similar reservations had been expressed by Norway and Denmark in communications to the U. S. prior to the meeting. The principal conclusion on the matter of followup procedures was the need to avoid setting up permanent new organizations, particularly if existing groups could do the work.

During the period between the June Workshop and the October Plenary, the U. S. held discussions with appropriate officials of the Allied Governments to obtain full agreement on the text of the Resolution to be submitted for adoption at the October Plenary. It was clear that while the text as adopted ad referendum at the June meeting was uniformly supported in principle, the statistical goal remained an area of disagreement. Taking suggestions of several nations into account, the U. S. proposed a revision which appeared generally acceptable. This compromise (later to be submitted to CCMS at the October 1973 Plenary) eliminated the percentage rate reduction. It provided for preventing any increase in the annual number of traffic deaths for each class of road user over the next five-year period, and included a progressive reduction thereafter.

H. CCMS Plenary (October 23-24, 1973)

At the Ninth CCMS Plenary, held in Brussels, the U. S. with Belgium, France and the Netherlands as cosponsors, introduced the International Resolution on Road Safety, and called for its adoption. Canada, Denmark, the Federal Republic of Germany, Italy, Norway, Portugal, Turkey, and the United Kingdom expressed support. The CCMS Chairman summed up the unanimous acceptance of the Resolution, stating that it would be forwarded to the North Atlantic Council with a recommendation for approval. The full text of the Resolution as adopted by CCMS is contained in Appendix 3 of this report.

With respect to concern expressed by delegates regarding the Resolution, the U. S. Under Secretary of Transportation (alternate U. S. Representative to CCMS) emphasized three points: (1) there is no intention of duplicating other international efforts in road safety or creating a continuing secretariat for road Safety; (2) the "best efforts" phrase of the amended goal paragraph did indeed apply to preventing any increase in traffic deaths as well as to the progressive reduction of that number thereafter; and (3) action programs were subject to agreement by CCMS before being annexed to the Resolution.

The Administrator of the National Highway Traffic Safety Administration, the new Director of the Road Safety Pilot Study, summarized the followup actions initiated or planned in the Alcohol and Highway Safety, Accident Investigation and Experimental Safety Vehicles Projects. He also outlined the need for an ad hoc group of road safety policy-making technical officials to coordinate followup actions on Pilot Study recommendations. The ad hoc group would be self-governing and provide policy-level support for technical initiatives.

The draft of the final report of the Road Safety Pilot Study was distributed by the U. S. with the request that the comments on the draft, particularly by road safety project leaders, be forwarded to the U. S. by December 17, 1973. These comments would be considered in preparing the final version of the report which would be presented for acceptance to the spring 1974 CCMS Plenary.

The U. S. Under Secretary of Transportation joined by France, Canada, the Federal Republic of Germany, the Netherlands, and Turkey extended a much deserved tribute to the former Road Safety Pilot Study Director for his valued contributions of the three-year Pilot Study.

ACTIVITIES SUBSEQUENT TO THE OCTOBER 1973 CCMS PLENARY

A. Experimental Safety Vehicles

On October 25-26, 1973 a meeting of the ESV Project participants was held in Crowthorne, England, attended by representatives of the Federal Republic of Germany, Japan, Sweden, the United Kingdom, and the United States. It was held at the request of the U. S. to consider accomplishments to date and discuss future ESV activities, including details of the Fifth ESV Conference to be hosted by the United Kingdom in London, June 4-7, 1974. The meeting resulted in the following agreements:

1. The U. S., in consultation with other countries, would redefine the future aims and objectives

of the International ESV Project in time for presentation at the Conference.

2. The United Kingdom and the U. S. would finalize the conference agenda.
3. The United Kingdom and the U. S. would draft a detailed notice of the conference for circulation to participating countries by January 1974.
4. In addition to the traditional national status reports, the agenda would include a series of technical seminars closely related to ESV development: (1) accident analysis; (2) biomechanics, human tolerance, and dummies; (3) vehicle structural properties, restraints, and vehicle aggressiveness; (4) accident avoidance versus active safety; (5) cost benefit analysis on energy and environmental considerations involving the automobile.

B. Accident Investigation

A meeting of the Coordinating Panel of the Accident Investigation Project was held November 27, 1973 in Paris to discuss the future course required to implement recommendations of the Project. The draft project report, and the proposed Accident Investigation Implementing Resolution to the International Resolution on Road Safety, were reviewed. Additional comments were to be submitted by the participants subsequent to the meeting. Tentative agreement was reached on an operational organization for continuation of accident investigation activities.

C. Final Report of Pilot Study

The initial draft of the final report on the Road Safety Pilot Study was distributed at the October 1973 Plenary. Members were invited to submit comments to the U. S. for consideration in preparing the final report. Most of the comments were received by the end of January 1974 in time to be reflected in the final report submitted by the U. S. to CCMS at the spring 1974 Plenary. This report on the overall Pilot Study, together with the reports listed in Appendix 5, comprises the documentary materials prepared during the course of the Pilot Study.

APPENDIX THREE

International Resolution on Road Safety [1]

THE NATIONS OF THE ALLIANCE

Deeply concerned by the seriousness of road safety problems, in particular with the continuing high social costs of unacceptable levels of deaths, injuries, and property damage resulting from road transport in modern societies;

Considering that, as a result of constantly increasing international road traffic, the levels of safety performance that an individual state places upon the road user, the vehicle, and the traffic infrastructure might well increasingly affect the safety of road users from other states;

Regarding the NATO CCMS Road Safety Pilot Study as having demonstrated that national governments, supported by their industries and other entities, can work effectively together in seeking solutions to road safety problems in transferring their knowledge, skills and experience in the field of road safety; and

Regarding the existing levels of knowledge, skills, and experience in the field of road safety to be such that through their multinational exchange and their concerted operational applications in systematic programs, modified or otherwise adapted to meet specific priority situations in a particular member nation, many additional lives can be saved and many more crippling injuries prevented;

1. **Do Hereby Resolve** as a common goal:
   To use their best efforts to prevent any increase in the annual number of traffic deaths for each class of road user on their road networks over the next five-year period, and thereafter to reduce such number progressively.

2. **And Do Further Resolve:**
   a. Each of them to monitor and assess at least every 2 years the results of the action programs mentioned below; and
   b. To cooperate in reexamining those programs and the above goal in the light of these assessments.

3. **And To These Ends Do Further Resolve:**
   a. To cooperate with each other, with nonmember nations, and in other multilateral forums in achieving the above goal through an increased exchange of existing road safety program techniques and operational practices, the development and testing of new knowledge, techniques and operational practices, use of cost-benefit analyses, and the elimination of any barriers to the development, transfer, and application of such knowledge, techniques and practices;
   b. To intensify their existing national road safety programs and/or augment them with action programs that for each member nation are best suited to the problems it will have to solve to meet the above goal, and to exchange with other member nations their action plans as soon as possible, but no later than September 1974, in order that a report on the exchange might be presented to the fall 1974 CCMS Plenary;
   c. To implement in their action programs in as timely and as complete a manner as practicable, the action recommendations to be annexed to this Resolution;
   d. To review annually in CCMS the progress of each member nation as to (1) implementing the action recommendations to be annexed to this resolution, (2) additional developments in implementing their road safety action programs, and (3) achieving the stated goal set out in paragraph 1 preceding; and
   e. To use their best efforts in stimulating other nations and multilateral forums: (1) to develop and exchange plans for their road safety action programs, (2) to adopt a goal similar to that set in paragraph 1 preceding, and (3) to review periodically thereafter the progress in developing and implementing comprehensive road safety action programs and saving lives.

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[1] Adopted by CCMS on October 24, 1973, approved by the North Atlantic Council on November 28, 1973, and endorsed in the Ministerial Session of that Council on December 11, 1973.

APPENDIX FOUR

Format for Exchanging Road Safety Action Programs (Illustrative)

The following format is prepared to illustrate the concept of having a single document as a vehicle for exchanging information on action programs. This exchange is called for under paragraph 3b of the International Resolution on Road Safety under which nations of the Alliance agree:

> ". . .3b to intensify their existing national road safety programs and/or augment them with action programs that for each member nation are best suited to the problems it will have to solve to meet the above goals, and to exchange with other member nations their action plans as soon as possible but no later than September 1974 . . ."

The document, which a member nation would prepare annually for exchange with others, and which would be intended for review by high-level government officials, is organized in three parts:

Part 1: This is a listing of the cognizant official in each of the selected areas of road safety activity.

Part 2: This is a presentation of statistical measures. Specifically, the annual number of deaths for each class of road user, traffic death rates per 100 kilometers of travel, and data on the frequency of accidents are requested. The latter will be an indicator of the effectiveness of measures aimed at preventing the occurrence of crashes.

Part 3: This part is comprised of sections on a specific area of road safety activity. Information requested includes the identity of responsible officials, statistical indicators of the extent of the problem and progress in dealing with it, and the status of action on various recommendations. Only the project areas of the Road Safety Study, less the ESV area, are shown in the illustrative examples. It is believed that the existing procedures under the Memoranda of Understanding and the periodic International Technical Conference on Experimental Safety Vehicles are effectively accomplishing full exchange and dissemination of ESV program information.

This is a working document which some appropriate groups of experts from member nations can use as a guide in arriving at a consensus document. The agreed-upon form should then be tested on a trial basis for several years and modified as indicated by experience before final adoption.

FORMAT

Part 1	Road Safety Program Personnel
Part 2	Vehicle Accident Information
Part 3	Road Safety Action Programs
Part 3.1	Road Hazards Identification and Correction
Part 3.2	Motor Vehicle Inspection
Part 3.3	Pedestrian Safety
Part 3.4	Emergency Medical Services
Part 3.5	Alcohol and Highway Safety
Part 3.6	Accident Investigation

PART 1

ROAD SAFETY PROGRAM PERSONNEL

Principal Responsible Official

(Name) ______________________________

(Title) ______________________________

(Agency) ______________________________

Principal Program Managers

Emergency Medical Services ______________________________
(Name)
____
(Title)
____
(Agency)

Experimental Safety Vehicles ______________________________

Motor Vehicle Inspection ______________________________

Road Hazards Identification and Correction ______________________________

Accident Investigation ______________________________

Pedestrian Safety ______________________________

Alcohol and Highway Safety ______________________________

Driver Education and Training[1] ______________________________

Police Traffic Services[1] ______________________________

Driver Licensing[1] ______________________________

Vehicle Safety Standards[1] ______________________________

ROAD SAFETY PROGRAM PERSONNEL (Continued)

Traffic Courts[1]

Seat Safety Belt Usage[1]

National Program Planning[1]

Road Safety Propaganda[1]

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[1] Not included in Pilot Study.

PART 2

VEHICLE ACCIDENT INFORMATION

TOTAL NUMBER OF DEATHS[1] RESULTING FROM VEHICLE ACCIDENTS IN ______________
(REPORTING COUNTRY)

	1971	1972	Change[2]
Drivers	______	______	__________
Passengers	______	______	__________
Pedestrians	______	______	__________
Motorcyclists	______	______	__________
Bicyclist (nonmotorized)	______	______	__________
(Total)	______	______	__________

	1971	1972	Change
Deaths Resulting from Vehicle Accidents Occurring in ______________ (Reporting Country) and Involving Drivers from Other Countries (included in above totals)	______	______	__________

	1971	1972	Change
Deaths of Citizens of ______________ (Reporting Country) From Vehicle Accidents Occurring in Other Countries (not included in above totals)	______	______	__________

---

[1] Victim succumbs within 30 days of accident due to injuries suffered at time of accident.

[2] The goal called for in the International Resolution on Road Safety is for nations ". . . to use their best efforts to prevent any increase in the annual number of traffic deaths for each class of road user on their road networks. . .".

Rate of Traffic Deaths per 100 Million Kilometers of Travel

	1972	1973	1974	1975	1976	1977
Rate	______	______	______	______	______	______
Percent Change over 1973			______	______	______	______

	1971	1972	Change
Rate of "Serious" Vehicle Accidents[3] per 100 Million Kilometers of Travel	______	______	______

---

[3] The frequency of vehicle accidents per 100 million kilometers of travel is an important indicator of the effectiveness of measures aimed at promoting "primary safety," that is, "accident prevention." For purposes here, a "serious" accident is defined as one resulting in death or injuries of such severity as to require treatment by a physician.

PART 3

ROAD SAFETY ACTION PROGRAMS

3.1 ROAD HAZARDS IDENTIFICATION AND CORRECTION

____
(Principal Program Manager)

____
(Title)

____
(Organization)

A. Extent of Problem in ______________
(Current Year)

1. Number of Hazardous Locations Needing Corrective Treatment

	Low Risk	Medium Risk	High Risk
At end of 1974 (Base Year)	______	______	______
At end of ______ (Last Year)	______	______	______
______ Actitivy (Current Year)	______	______	______
Corrections Completed	______	______	______
New Identifications	______	______	______
Net Change	______	______	______
At end of ______ (Current Year)	______	______	______

2. Fatalities on Hazardous Locations Needing Corrective Treatment

	Low Risk	Medium Risk	High Risk
During 1974 (Base Year)	______	______	______
During ______ (Last Year)	______	______	______
During ______ (Current Year)	______	______	______

3. Cumulative Number of Fatalities on Hazardous Locations During Period Since Need for Corrective Treatment was Identified

	Low Risk	Medium Risk	High Risk
Years Since Needed Correction was Identified			
1 or less	______	______	______
2	______	______	______
3	______	______	______
4	______	______	______
5 or more	______	______	______

B. Progress in ____________________
(Current Year)

1. Cumulative Number of Fatalities BEFORE and AFTER Corrective Treatments Were Completed

Years Prior to Correction	Years After Correction														
	Low Risk					Medium Risk					High Risk				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	B/A					B/A					B/A				
2		B/A					/					/			
3			B/A					/					/		
4				B/A					/					/	
5					B/A					B/A					B/A

2. Cumulative Number of "Serious" Accidents BEFORE and AFTER Corrective Treatments were Completed

	Years After Correction														
	Low Risk					Medium Risk					High Risk				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1															
2															
3															
4															
5															

B - BEFORE Corrective Treatment
A - AFTER Corrective Treatment

C. Program Action

The Road Hazard Identification and Correction Implementing Resolution calls for nations:

"1. To develop, in concert with each other and with some appropriate division of workload, a model program for the identification and correction of road hazards. The model would be comprised of standards, definitions, and operational protocols for all aspects of a comprehensive program, including but not limited to:

- procedures for identifying hazardous locations (a priori and a posteriori)
- alternatives for treatment (correction) of each class of hazardous location
- procedures for forecasting accident reductions that alternative treatments will produce
- a cost-effectiveness methodology for selecting the "best" set of improvements, "best" being established by considering jointly the cost of the improvement and the forecasted accident reductions in lives saved
- procedures for assessing the effectiveness of each improvement made. Such procedures would compare the achieved reductions in accident losses with the forecasts, and would provide data for improving the procedures for forecasting and assessing cost-effectiveness
- a policy on the allocation of funds between corrections of existing hazardous locations and construction of new highways
- a policy that defines responsibilities between all levels of government (federal, state and local) for each of the various aspects of a comprehensive program for road hazards identification and correction
- a policy that requires a continuous review of all highway safety improvements to determine the success or failure in reducing accidents, deaths and injuries;

"2. Each to initiate intensification of the above elements in its current program for the identification and correction of road hazards without waiting for a model program to be agreed upon; and

"3. Each to incorporate into its program, to the fullest extent practicable, elements of the model program as agreement is reached on them."

Brief narrative summarizing national programs and activities as well as international activities in support of or as part of the implementation of each of the above.

____

____

____

____

____

____

____

____

____

____

____

ROAD SAFETY ACTION PROGRAMS (Continued)

3.2 MOTOR VEHICLE INSPECTION

____
(Principal Program Manager)

____
(Title)

____
(Organization)

A. Extent of Problem in ______________
(Base Line Year)

	Total Vehicle Population				Vehicles Involved in Accidents			
	Passenger Cars	Trucks	Buses	Motorcycles	Passenger Cars	Trucks	Buses	Motorcycles
% Vehicles Inspected								
Condition of Brakes in Vehicles Inspected (percent)								
Fail*								
Marginal**								
Pass***								
Condition of Tires in Vehicles Inspected (percent)								
Fail*								
Marginal**								
Pass***								

---

* Fail (repair required): Either brakes, tires or steering-suspension.

** Marginal (repair advisory): Either brakes, tires, or steering-suspension.

*** Pass: No marginal or fail ratings.

A. Extent of Problem in ________________ (Cont'd)
(Base Line Year)

	Total Vehicle Population				Vehicles Involved in Accidents			
	Condition of Steering/Suspension in Vehicles Inspected (percent)							
	Passenger Cars	Trucks	Buses	Motorcycles	Passenger Cars	Trucks	Buses	Motorcycles
Fail*								
Marginal**								
Pass***								
	Overall Condition of Vehicles Inspected (percent)							
Fail*								
Marginal**								
Pass***								

* Fail (repair required): Either brakes, tires or steering-suspension.

** Marginal (repair advisory): Either brakes, tires, or steering-suspension.

*** Pass: No marginal or fail ratings.

B. Progress in ________________
(Current Year)

	Total Vehicle Population				Vehicles Involved in Accidents			
	Passenger Cars	Trucks	Buses	Motorcycles	Passenger Cars	Trucks	Buses	Motorcycles
Base								
Current								
Last								

B. Progress in ______________ (Cont'd)
(Current Year)

	Total Vehicle Population				Vehicles Involved in Accidents			
	Passenger Cars	Trucks	Buses	Motorcycles	Passenger Cars	Trucks	Buses	Motorcycles
% Vehicles Inspected								
Base								
Current								
Last								
Condition of Brakes in Vehicles Inspected (percent)								
Base								
Fail*								
Marginal**								
Pass***								
Current								
Fail*								
Marginal**								
Pass***								
Last								
Fail*								
Marginal**								
Pass***								
Condition of Tires in Vehicles Inspected (percent)								
Base								
Fail*								
Marginal**								
Pass***								
Current								
Fail*								
Marginal**								
Pass***								
Last								
Fail*								
Marginal**								
Pass***								

* Fail (repair required); Either brakes, tires or steering-suspension.

** Marginal (repair advisory): Either brakes, tires, or steering-suspension.

*** Pass: No marginal or fail ratings.

B. Progress in ______________ (Cont'd)
(Current Year)

	Total Vehicle Population				Vehicles Involved in Accidents			
	Condition of Steering/Suspension in Vehicles Inspected (percent)							
	Passenger Cars	Trucks	Buses	Motorcycles	Passenger Cars	Trucks	Buses	Motorcycles
Base								
Fail*								
Marginal**								
Pass***								
Current								
Fail*								
Marginal**								
Pass***								
Last								
Fail*								
Marginal**								
Pass***								
	Overall Condition of Vehicles Inspected (percent)							
Base								
Fail*								
Marginal**								
Pass***								
Current								
Fail*								
Marginal**								
Pass***								
Last								
Fail*								
Marginal**								
Pass***								

* Fail (repair required): Either brakes, tires or steering-suspension.

** Marginal (repair advisory): Either brakes, tires, or steering-suspension.

*** Pass: No marginal or fail ratings.

C. Program Action

The Motor Vehicle Inspection Implementing Resolution calls for nations:

"1. To refine and implement on a sampling basis as a part of their national accident investigation and motor vehicle inspection programs, procedures designed to show:
  - the relationship between vehicle defects and accidents, and inspection and accidents
  - environmental and economic benefits resulting from motor vehicle inspections and repairs generated by inspections;

"2. To initiate programs for the technical development of efficient inspection methods and equipment; and

"3. To work jointly with other nations in an appropriate international organization or otherwise to:
  - seek greater standardization of various aspects of motor vehicle inspection such as inspection equipment, training of inspectors and technicians, criteria for measuring the safe or unsafe condition of a vehicle component, and inspection station management
  - develop systems for exchanging the information developed in paragraphs 1 and 2 above."

Brief narrative summarizing national programs and activities as well as international activities in support of or as part of the implementation of each of the above.

ROAD SAFETY ACTION PROGRAMS (CONTINUED)

3.3 PEDESTRIAN SAFETY

____
(Principal Program Manager)

____
(Title)

____
(Organization)

A. Extent of Problem in ________________
(Current Year)

1. Pedestrian Deaths in Relation to All Traffic Deaths

	Number	Percentage
________ Pedestrian Deaths	______	________ %
(Base Year) All other traffic deaths	______	________ %
		100 %
________ Pedestrian Deaths	______	________ %
(Last Year) All other traffic deaths	______	________ %
		100 %
________ Pedestrian Deaths	______	________ %
(Current Year) All other traffic deaths	______	________ %
		100 %

2. Pedestrian Deaths by Age Group

	0-4	5-14	15-19	20-59	60 and over	Total
________	______	______	______	______	______	______
(Base Year)	%					100%
________	______	______	______	______	______	______
(Last Year)	%					100%
________	______	______	______	______	______	______
(Current Year)	%					100%

B. Program Action

The Pedestrian Safety Implementing Resolution calls for nations:

"1. To designate a single official to be responsible for pedestrian safety programs or at a minimum to be cognizant of the various interrelated programs that are directed toward reducing the number and severity of pedestrian casualties. These include programs with respect to public works and traffic engineering, police traffic enforcement, ordinances and regulations, education and public information, zoning and urban planning, and vehicle safety regulations. Such a person would serve as a contact point and communications link at the working level with counterpart technical officials in other countries to coordinate information exchange and planning for cooperative development and demonstration;

"2. To develop and implement programs for systematically assessing the magnitude and causes of the pedestrian casualty problem. An appropriate data collection and statistical analysis procedure designed specifically for these purposes is mandatory to meet these requirements;

"3. To review their road safety budget and resource allocations both in research and current measures with a view toward allocating to pedestrian safety a share of resources proportionate to the extent of the problem contributed by pedestrian casualties;

"4. To intensify or otherwise improve the effectiveness of their pedestrian crossing systems and pedestrian safety regulations; particularly with respect to evaluating new or unproven systems, to achieving greater uniformity, and assuring good enforcement of regulations found to be effective;

"5. To initiate measures to ensure that in seeking to reduce delay and congestion in urban areas, officials consider the extent to which these alternatives increase or reduce hazards to pedestrians;

"6. To augment or initiate a program to educate, train, inform, and otherwise upgrade the awareness of local government officials of the implications of their work to pedestrian safety, and to secure their support for intensified efforts in this regard;

"7. To augment or initiate new programs of training, education, and publicity on behavior which will improve pedestrian safety, such programs to be targeted specifically to several different types of audiences;

"8. To establish as a matter of national policy that an assessment be made of its effectiveness in reducing pedestrian casualties before any new road safety improvement program for training, education, or publicity is initiated;

"9. To establish a national program to ensure full consideration of pedestrian safety requirements in the planning of new towns and urban redevelopments;

"10. To adopt as national policy the position that front-end motor vehicle design which minimizes pedestrian injuries carries higher priority than designs which reduce vehicle damage in minor crashes at low (e.g., parking lot) speeds. Further, it should also be adopted as national policy that such design be accorded at least the same priority as that which minimizes injuries to vehicle occupants;

"11. To modify any existing or proposed regulations that unreasonably compromise pedestrian protection in favor of reduced vehicle property damage or higher levels of occupant protection;

"12. To seek optimum solutions for vehicle front-end designs that both protect pedestrians and vehicle occupant under otherwise lethal impacts;

"13. To mutually examine the effectiveness and applicability of all existing rules and regulations relevant to pedestrian safety, to develop a set of rules and regulations of optimum effectiveness, and for each to modify their rules and regulations to achieve uniformity with those identified as being optimally effective;

"14. To mutually develop and individually implement a model national program for developing and maintaining a statistical base and research program appropriate both for assessing the magnitude and nature of the pedestrian safety problem, and for evaluating the effectiveness of all activities aimed at reducing pedestrian casualties; and

"15. To mutually develop and individually implement procedures for initiating cooperation development and demonstration projects in pedestrian safety, for evaluating the effectiveness of these and other new approaches, and for exchanging the resulting data."

Brief narrative summarizing national programs and activities as well as international activities in support of or as part of the implementation of each of the above.

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ROAD SAFETY ACTION PROGRAMS

3.4 EMERGENCY MEDICAL SERVICES

____
(Principal Program Manager)

____
(Title)

____
(Organization)

A. Extent of Problem in ______________
(Current Year)

1. Number of Vehicle Accident Victims Who Succumb Before Medical Assistance Reaches the Scene

	Urban	Rural
______ (Base Year)	______	______
______ (Last Year)	______	______
______ (Current Year)	______	______

2. Number of Vehicle Accident Victims Who Succumb After Medical Assistance Reaches the Scene But Before Delivery to Hospital

	Urban	Rural
______ (Base Year)	______	______
______ (Last Year)	______	______
______ (Current Year)	______	______

3. Average Response Time From Instant of the Crash Until Medical Assistance Reaches Scene (Minutes)

	Urban	Rural
____ (Base Year)	____	____
____ (Last Year)	____	____
____ (Current Year)	____	____

4. Average Response Time From Instant of Crash to Delivery of Victim to Hospital (Minutes)

	Urban	Rural
____ (Base Year)	____	____
____ (Last Year)	____	____
____ (Current Year)	____	____

B. Program Action

The Emergency Medical Services Implementing Resolution calls for nations:

"1. To develop and implement programs, on an appropriate sampling basis, to obtain data for assessing the extent of the problem of providing adequate emergency medical response systems to aid vehicle crash victims in both rural and urban areas;

"2. To intensify each of their EMS programs, adapting to their needs the findings of the EMS Project of the CCMS Road Safety Pilot Study, so as to reduce the number of deaths that occur from the time of the vehicle crash to the delivery of injured victims to a hospital;

"3. To apply the EMS assessment model, adapting it as necessary to meet local needs, making the findings available to the community of nations;

"4. To assess the need for expanded training programs of both professionals and paraprofessionals in the emergency medical response field, and to implement such training programs as are found to be required;

"5. To design and implement a continuing program to assess the benefits and costs of existing and new EMS practices, with particular attention to the use of helicopters, advanced command and control (communications) networks, centrally dispatched ambulances, closed-circuit TV, and other communications (such as telemetry of vital function data from the pickup point to computers in regional or national medical centers);

"6. To establish national standards of performance for EMS systems and initiate the necessary statutory or administrative actions to ensure implementation at federal, state and local levels; and

"7. To establish public information and education programs on the relevance of proper EMS systems to saving the lives of people injured in crashes."

Brief narrative summarizing national programs and activities as well as international activities in support of or as part of the implementation of each of the above.

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ROAD SAFETY ACTION PROGRAMS

3.5 ALCOHOL AND HIGHWAY SAFETY

(Principal Program Manager)

(Title)

(Organization)

A. Extent of Problem in ____________________
(Current Year)

1. % Total Driving Population with Blood Alcohol Concentrations
B. A. C. % by Weight

	0	Up to .04	.05 to .09	.10 to .14	Over .15
(Base Year)					
(Past Year)					
(Current Year)					

2. % Fatally Injured Drivers with Blood Alcohol Concentrations

	0	Up to .04	.05 to .09	.10 to .14	Over .15
(Base Year)					
(Past Year)					
(Current Year)					

3. % Fatally Injured Pedestrians with Blood Alcohol Concentrations

	0	Up to .04	.05 to .09	.10 to .14	Over 15
(Base Year)					
(Past Year)					
(Current Year)					

4. **% Fatal Crashes by Time of Day***

	6 a.m.-Noon	Noon-6 p.m.	6 p.m.-Midnight	Midnight-6 a.m.
(Base Year)				
(Current Year)				
(Year) Goal				

B. Program Action

The Alcohol and Highway Safety Implementing Resolution calls for nations:

"1. To maintain and increase measures against drinking and driving;

"2. To maintain and increase measures to reduce crashes in which alcohol plays a role;

"3. To maintain or develop an integrated national alcohol safety program directed toward systematic planning of countermeasures effort;

"4. To maximize efforts to evaluate the effectiveness of alcohol countermeasure programs;

"5. To support these efforts by making every effort to conduct national roadside surveys of drivers to determine their blood alcohol concentrations;

"6. To conduct such surveys so as to satisfy the minimum procedures and the reporting format recommended by the Alcohol and Highway Safety Project of the CCMS Road Safety Pilot Study;

"7. To furnish data of such surveys to Canada who will collate and disseminate the results;

"8. To cooperate with each other and with non-member nations in an appropriate international organization to:
  - develop a model of performance specifications for equipment used in measuring alcohol in the breath
  - develop alcohol countermeasures and exchange information on such measures
  - conduct related research and exchange resulting data; and

"9. To organize themselves for purposes of implementing or coordinating and reviewing the international cooperative effort called for above and to facilitate the information exchange."

Brief narrative summarizing national programs and activities as well as international activities in support of or as part of the implementation of each of the above.

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*Nighttime fatal crashes more likely to involve alcohol than daytime crashes.

ROAD SAFETY ACTION PROGRAMS (Continued)

3.6 ACCIDENT INVESTIGATION

____
(Principal Program Manager)

____
(Title)

____
(Organization)

____
(Name of Member of International Roadway
Accident Investigation Panel)

____
(Title)

____
(Organization)

A. Accident Investigation Teams ______________
(Current Year)

Team Leader ______________________________
(Name)

Team Designation ______________________________

Team Address ______________________________

____

Number of Team Members ______________

Composition of Team: (Check appropriate ☐ s)

Policeman ☐; Traffic Engineer ☐; Highway Engineer ☐;

Physician ☐; Psychiatrist/Psychologist ☐;

Automotive Engineer ☐; Automotive Mechanic ☐;

Others ______________________________

Number of Accidents Investigated by Team __________

(Note: For additional Teams Repeat above Data)

Total Number of Teams __________

Total Number of Accidents Investigated __________

B. Extent of Problem ______________
(Current Year)

1. Types and number of accidents investigated using the Collision Analysis Report Form (CARF)

Number of Head-on Collisions	______________
Number of Rear End Collisions	______________
Number of Side Impact Collisions	______________
Number of Rollover Collisions	______________
Number of Fixed Object Collisions	______________
Number of Auto-Pedestrian Collisions	______________
Number of Motorcycle and Bicycle Collisions	______________
Number of Other Type Collisions	______________
Number of Multiple Vehicle Collisions	______________
Number of Single Vehicle Collisions	______________
Number of Other Type Accidents	______________
,Total number of accidents investigated, using CARF	______________

2. Fatalities, Injuries and Property Damage

Number of Fatal Accidents in CARF file ________
Number of Injury Accidents in CARF file ________
Number of Property Damage only Accidents in CARF file ________

TOTAL ________

3. Distribution of Accidents by Vehicle Deformation Index (VDI) Rating

VDI Level #1 ________
VDI Level #2 ________
VDI Level #3 ________
VDI Level #4 ________
VDI Level #5 ________
VDI Level #6 ________
VDI Level #7 ________

TOTAL ________

4. Distribution of Accidents by Abbreviated Injury Scale (AIS) Rating

AIS Rating #1 ________
AIS Rating #2 ________
AIS Rating #3 ________
AIS Rating #4 ________
AIS Rating #5 ________
AIS Rating #6 ________
AIS Rating #7 ________
AIS Rating #8 ________
AIS Rating #9 ________

TOTAL ________

C. Program Action

Status-implementation of Accident Investigation Implementing Resolution:

"1. To establish or identify an existing agency or organization to oversee the implementation and operation of an accident investigation effort at the national and local levels in cooperation with an international accident investigation system."

Name of Agency ________

Estimated date of Agency selection or establishment ________

"2. To participate to the fullest extent practicable in cooperation with their automotive industries and research communities, in international accident investigation programs that are initiated as followup to the CCMS effort."

Brief summary of participation in international programs.

____
____
____
____
____

"3. To incorporate uniform definitions and other accident investigation protocols into their national, state and local accident investigation programs at such time as they are developed by duly constituted international groups."

Brief summary of uniform definitions incorporated in protocols or attach appropriate document(s) (if available).

"4. To organize a group, in which they would be represented by policy-level government officials, to guide the development, testing and implementation of international protocols for conducting both routine and research-type accident investigation."

Policy level official (and alternate, if appropriate) designated for membership in group:

(Name) (Title) (Organization)

(Address)

Alternate:

(Name) (Title) (Organization)

(Address)

"5. To develop in concert with each other an international accident investigation system whereby all nations, their automotive industries, and research communities can initiate cooperative efforts that will permit both aggregation and comparison of that data that each collects."

Brief summary of internal activities to support international system.

Additional Comments or Recommendations:

APPENDIX FIVE

Documents Published under the Auspices of the CCMS Road Safety Pilot Study

1. Report on the First International Conference on Passive Restraints, May 11-12, 1970, Milford, Michigan; (CCMS Report No. 3; Available CCMS* and NHTSA**)
2. Report on the Second International Conference on Passive Restraints, May 22-24, 1972, Detroit, Michigan; (Available SAE*** Publication No. P46, $39.00)
3. Report on the International Vehicle and Highway Safety Conference, May 30 - June 2, 1972, Washington, D.C.; (Available NHTSA**)
4. Report on the International Conference on Alcohol and Traffic Safety, June 1, 1972, Washington, D.C.; (In process of publication, Available NHTSA**, June 1974)
5. Report on Alcohol Safety Action Projects: Evaluation of Operations 1972, Volume I Summary. (Available NHTSA**)
6. Report on Road Side Surveys of Drinking/Driving Behavior: A Review of the Literature and a Recommended Methodology. (Available Department of Transport, Canada**** in French and English)
7. Report on the First International Technical Conference on Experimental Safety Vehicles, Paris, France, January 25-27, 1971. (Available U.S. Government Printing Office, Washington, D.C. 20402 – Stock No. 5003-0036, $1.25)
8. Report on the Second International Technical Conference on Experimental Safety Vehicles, Sindelfingen, Germany; October 26-29, 1971. (Available U.S. Government Printing Office, Washington, D.C. 20402 – Stock No. TD8.16:971-2, $2.75)
9. Report on the Third International Technical Conference on Experimental Safety Vehicles, Washington, D.C.; May 30 - June 2, 1972. (Available U.S. Government Printing Office, Washington, D.C. 20402 – Stock No. 5503-0084; $3.00)
10. Report on the Fourth International Technical Conference on Experimental Safety Vehicles, Kyoto, Japan, March 13-16, 1973. (Available U.S. Government Printing Office, Washington, D.C. 20402 – Stock No. 5003-00143, $7.35) .
11. Report on the Road Safety Pilot Study. (CCMS Report No. 21; Available CCMS* and NHTSA** in French and English)
12. Report on Emergency Medical Services Project (CCMS Report No. 22; Available CCMS* and NHTSA**)
13. Report on Experimental Safety Vehicles Project (CCMS Report No. 23; Available CCMS* and NHTSA**)
14. Report on Motor Vehicle Inspection Project (CCMS Report No. 24; Available CCMS* and NHTSA**)
15. Report on Identification and Correction of Road Hazards Project, (CCMS Report No. 25; Available CCMS* and NHTSA** in French only)
16. Report on Accident Investigation Project (CCMS Report No. 26; Available CCMS* and NHTSA**)
17. Report on Pedestrian Safety Project (CCMS Report No. 27; Available CCMS* and NHTSA**)
18. Report on Alcohol and Highway Safety Project (CCMS Report NO. 28; Available CCMS*, NHTSA**, and Department of Transport, Canada**** in French and English)
19. Report on International Accident Investigation Workshop, June 28-29, 1973, Brussels, Belgium. (Available NHTSA**)

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*CCMS – Committee on the Challenges of Modern Society. 1110 Bruxelles, Brussels, Belgium.

**NHTSA – National Highway Traffic Safety Administration. 400 7th Street, S.W., Washington, D.C. 20590. Attention: General Services Division, Code N 48-51.

***SAE – Society of Automotive Engineers. Two Pennsylvania Plaza, New York, New York. 10001. Attention: Publication Division.

****Department of Transport, Canada – Department of Transport, Road Safety Branch, Ottawa, Ontario KIA ON5, Canada.

Notes: The above reports are available in English only, unless otherwise noted.
Reports 12 through 17 will not be available until July 1974.